SMITHSONIAN MISCELLANEOUS COLLECTIONS.

143

LAND AND FRESH WATER SHELLS

OF

NORTH AMERICA.

PART II.

PULMONATA LIMNOPHILA AND THALASSOPHILA.

BY

W. G. BINNEY.

WASHINGTON:
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SEPTEMBER, 1865.

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PREFACE.

THE *Pulmonata* are usually divided into *Geophila, Limnophila*, and *Thalassophila*, according as their habits are terrestrial, fluviatile, or marine. The first division is included in the Land and Fresh-Water Shells, Part I, now ready for the press. The second and third divisions form the subject of the present volume.

The descriptions of the family *Auriculidæ* have already been published in the fourth volume of The Terrestrial Mollusks of the United States. In the other families I have adopted the plan of giving the original description, or an English translation of it, and a fac-simile of the original figure not only of each species, but also of all those I have considered synonyms. I have thus placed within the reach of every American student all the materials for a complete monograph of the *Lymnæidæ*, &c., of North America which can be obtained from books. The other, more important, source of knowledge of the subject can be gained only by gathering together from every part of the country large suites of specimens, fairly representing each species. Not until this is done can their characters be described, and information given of their variation, their geographical distribution, and their relations to each other.

Though not competent to prepare a monograph all whose decisions may be considered final, it has been easy in numerous cases to refer supposed new species to those previously described. These instances arise from ignorance on the part of one author of the labors of those preceding him, or in his exaggeration of variations which to me have appeared too slight to denote specific difference. The repetition of the original description and figure of each of these synonyms will enable the student to judge for himself of the correctness of my decisions.

The Museum Register printed after the description of each species will show how large a collection of specimens I have had

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before me belonging to the Smithsonian Institution. In addition to these I have had the opportunity of studying all the original specimens of Mr. Say, Prof. Haldeman, Dr. Gould, Mr. Lea, the Academy of Sciences of Philadelphia, the Museum of Comparative Zoology at Cambridge. I have received also typical specimens from almost all those who have described species, and corresponded so generally on the subject, that were I to specify those to whom I am indebted for information, the list would contain the name of nearly every living American conchologist.

The descriptions of orders, families, genera, and subgenera are principally copied from "The Genera of Recent Mollusca."

The subject is brought down to January, 1864.

All the original figures of shells and lingual dentition were drawn by Mr. E. S. Morse, of Gorham, Maine.

W. G. BINNEY.

BURLINGTON, N. J., August, 1865

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LAND AND FRESH-WATER SHELLS

OF

NORTH AMERICA.

II.

PULMONATA.

SUBORDER LIMNOPHILA.

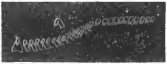
Eyes sessile; tentacles subcylindrical or flattened, simply contractile. Operculum wanting. Animal usually lacustrine or fluviatile, sometimes marine or littoral, rarely terrestrial.

All the known families of *Limnophila* are represented in this country. Their habits are described under each.

FAMILY AURICULIDÆ.

Lingual membrane broad and elongated; teeth numerous, in slightly bent, cross series; central tooth equilateral; lateral teeth rather inequilateral, diminishing in size towards the outer edge. Head ending in a snout; mouth with a horny lunate upper jaw,[1] and with two dilated buccal lobes, united

Fig. 1.



Lingual dentition of *Alexia myosotis*.

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[1] See *Alexia myosotis*, p. 4.

above, separated below; tentacles subcylindrical, contractile; eyes sessile at the inner sides of the bases. Mantle closed, with a thickened margin; foot long, posteriorly blunt; respiratory orifice posterior, on the right side, excretory orifice near it. Sexes united, orifices of generative organs distant, on the right side.

Shell spiral, covered with a horny epidermis; aperture elongate, with strong folds on the inner lip; outer lip often dentate.

Animal usually frequenting salt marshes.

The *Auriculidæ* are easily distinguished from the other inoperculated air-breathing Mollusks. They are furnished with but one pair of non-retractile tentacles, on the inner base of which are situated the sessile eyes. The head is extended beyond the tentacles into an obtuse, rounded, bilobed snout. The mantle is thin, thickened on its margin. The foot is elongated and pointed. The sexes are united in each individual.

The shell is spiral, extremely variable, and in the American species conic, generally with a flattened spire, and furnished with numerous tooth-like laminæ, which contract the narrow aperture. The internal septa are usually removed.

The *Auriculidæ* are amphibious Mollusks, breathing free air, but apparently dependent for existence on a great deal of moisture, if not on the actual vicinity of the sea. Some species pass their whole life under circumstances which seem to preclude the possibility of their respiring air. Thus *Alexia myosotis* is often found on isolated stones in salt marshes, which are entirely covered by the tide four hours out of twelve. This species, when immersed in fresh water, becomes benumbed and soon dies.

Carychium exiguum, on the other hand, though found under similar circumstances, does not depend on the proximity to salt water, being widely distributed far beyond its influence over the interior of the country. *Blauneria pellucida*, also, has been detected living far from any water in a garden in the District of Columbia, whither it was introduced on plants from Charleston, S. C. With the exception of the two last mentioned, the American species are found on salt marshes and in brackish water near the sea.

Of the geographical distribution of our species but little is yet known. *Melampus bidentatus* is found from Maine to Texas.

Melampus obliquus is referred by Say to South Carolina. *Alexia myosotis* was probably introduced from Europe; I have never known of its being found south of New York harbor. *Carychium exiguum* will probably be found in all the States. The other species are confined to the coast of Florida and the Gulf of Mexico, some of them being common to Cuba and other West Indian Islands.

There are several genera of *Auriculidæ* not represented in this country, some attaining a large size, and with more brilliant coloring than our plain species, such as *Pythia*, *Cassidula*, *Auricula*, &c. They are widely distributed over the globe, reaching the greatest perfection in the Pacific Islands.

The family has been subdivided into *Auriculinæ* and *Melampinæ*, characterized by the comparative thickening or expansion of the outer lip.

Subfamily AURICULINÆ.

Animal terrestrial, living chiefly on the land. Tentacles developed. Shell with the inner lip plicate; outer lip thickened or expanded.

AURICULA, Lamarck.

No species of this genus, as now restricted, is found in the United States. The following list contains all the species described as *Auriculæ*, and the position in which they are now classed.

Spurious Species.

Auricula bidentata, Gld. &c., is the same as *Melampus*.
Auricula biplicata, Desh., is the same as *Melampus bidentatus*.
Auricula cingulata, Pf. &c., is the same as *Tralia*.
Auricula cornea, Desh., is the same as *Melampus bidentatus*.
Auricula denticulata, Gld., DeK., is the same as *Alexia myosotis*.
Auricula floridana, Shuttl., is the same as *Tralia*.
Auricula jaumei, Mittre, is the same as *Melampus bidentatus*.
Auricula obliqua, DeK., is the same as *Melampus obliquus*.
Auricula sayii, Küster, is the same as *Leuconia sayii*.
Auricula stenostoma, Küster, is the same as *Tralia cingulata*.
Auricula bidens, Say of Pot. et Mich. Mr. Say never described any such species.

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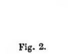
ALEXIA, (Leach), Gray.

Fig. 2.



Animal of *Alexia myosotis.*

Fig. 3.

Jaw of *Alexia myosotis.*[1]

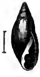
Foot simple beneath, without a transverse groove.

Jaw narrow, slightly arcuate, extremities but little attenuated, striæ obsolete, scarcely any median projection. Lingual dentition, see p. 1, Fig. 1.

Shell oblong-ovate, thin, spire pointed; last whirl large, rounded at base; aperture rather broad, oval, acuminating; parietal wall furnished with from one to five tuberculous laminæ; columellar fold oblique; peristome expanded, armed with teeth, or thickened within.

But one species is known to inhabit North America. Most of the few foreign species inhabit the coasts of the Mediterranean, though the genus is represented in South America and the West Indies.

Fig. 4.



Alexia myosotis.

Alexia myosotis, Draparnaud.—Shell elongate-oval, thin, semi-transparent, smooth and shining; dark horn-color, with a narrow reddish sutural line; spire produced with an acute apex; suture distinctly impressed; whirls from seven to eight, the upper ones rather convex, the last one elliptically ovate, equalling five-sevenths of the shell's length; aperture subvertical, about four-sevenths the length of the shell; peristome somewhat expanded and thickened, sometimes furnished with tooth-like folds on its inner side; its basal termination appressed to the shell, slightly reflected over a minute perforation, and turning upwards till it blends with the columellar fold, which winds into the aperture; the pariotal wall is furnished with a white, transverse, thin, and sharp denticle, and a second smaller, much less prominent one, placed above it. Greatest diameter 4, length 8 millimetres.

Auricula myosotis, Draparnaud, &c.

Auricula denticulata, Gould, Invert. of Mass. 199, f. 129 (excl. *Voluta denticulata*, Mont. et syn. suis.) (1841), not of Montfort.

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[1] From Moquin-Tandon.

Auricula denticulata, DeKay, N. Y. Moll. 58, pl. v, f. 91, 93 (excl. *Voluta denticulata*, Mont. et syn.), nec Montfort.

Melampus borealis, Conrad, Am. Journ. Sc. [2], XXIII, 345 (1833).

Alexia myosotis, Pfeiffer, Mon. Auric. Viv. 148; Brit. Mus. Auric. 114. —W. G. Binney, T. M. IV, 172, pl. lxxv, f. 33; pl. lxxix, f. 16.

Carychium (Phytia) myosotis, Moquin-Tandon, Moll. Fr. II, 417, pl. xxix, f. 33–39; pl. xxx, f. 1–4.

Conovulus myosotis, Reeve, Br. L. & Fr. W. Sh. 130 (1864).

Animal short, about one-half the length of the shell, dirty white, darker on the head and tentacles; eyes black, placed at the inner base of the feelers; feelers quite short, wrinkled, bulbous at tip, sufficiently dark to be visible through the thin shell when the animal withdraws itself; head continued beyond the tentaculæ into an obtuse, short, bilobed snout; the shell is carried horizontally on the animal's back; the obtusely pointed posterior termination of the foot is just visible beyond the shell; the animal is sluggish in its movements. (See p. 4, Fig. 2.)

Jaw. (See p. 4, Fig. 2.)

Lingual dentition. (See p. 1, Fig. 1.)

I have received specimens of this species from Nova Scotia to Rhode Island. It is also a well-known inhabitant of parts of the coasts of England, France, Spain, &c.

I have placed this shell in this genus on the authority of Pfeiffer and of Adams' genera. It has been placed in many different genera by European authors. In America it has been considered an *Auricula* by Gould and others, until Stimpson classed it among the *Melampi*. From the exterior of the animal there appears no difference between it and *Melampus bidentatus*. It does not even agree with the animal of *Alexia*, given by Adams in the Genera of Recent Mollusca, which I have copied on pl. 75, fig. 22, of The Terrestrial Mollusks. This figure represents the true *Alexia denticulata*, Montfort, with which Gould confounds this species. The shell is also quite distinct. It is, however, united to *Alexia myosotis*, by Forbes and Hanley, in their work on British Mollusca, and by Moquin-Tandon. Pfeiffer considers them distinct, as does also Reeve.

It is probably an imported species, as Stimpson remarks (Sh. of New Eng.), being found only in the Atlantic seaports. At Boston it is common on old wooden wharves in the harbor. It is also found on isolated stones which are immersed by the rising tide at least four hours out of the twelve. When placed in fresh water it becomes benumbed and dies; it will live without water in captivity several days.

There can be no doubt of *M. borealis*, Conrad, being identical with this species. Conrad's description is given below.

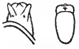
Melampus borealis.—Shell ovate-acute, elongated; pale horn-color, with darker longitudinal bands; whirls six or seven, with a revolving impressed line below the suture; spire elevated, conical; columella with three distant and distinct plaits, the middle one most prominent; aperture obovate-acute. Length about one-fourth of an inch.

This small species of *Melampus* has been found sparingly on the coast of Rhode Island, by Lieut. Brown, of Newport. It is similar in form to a *Bulimus*, and is very unlike the common species with which it associates. (*Conrad.*)

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8743	4	Massachusetts.	W. G. Binney.	Cabinet series.
8790	12	"	W. Stimpson.	......

CARYCHIUM, Müller.

Fig. 5.



Carychium exiguum.

Foot not transversely divided beneath.

Shell pupa-shaped, very thin, transparent, with but few whirls; aperture suboval; with one dentiform columellar fold, sometimes obsolete; parietal wall with 1 or 2 teeth; peristome expanded, terminations not approximating, the right hand one with one internal tooth.

Fig. 6.

Lingual dentition of *Carychium exiguum.*

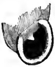
Jaw slightly arched, without ribs or marginal denticulations, hardly striated towards the margin.

Teeth in slightly bent cross series, central equilateral, narrow, laterals broad, short, denticulated.

But very few species of this genus have been described, most of which are from Europe. Animal terrestrial.

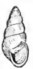
Carychium exiguum, Say.—Shell elongated, tapering at both ends, white, translucent, shining; apex rather obtuse; whirls five to six, convex, very oblique, with transverse striæ; suture distinct, impressed; aperture obliquely oval, white, with a prominent plait on the columellar margin, about midway between the extremities of the lip, and a slightly prominent fold near the junction of the lip with the umbilical extremity of the shell; lip thick, reflected, flattened; umbilicus perforated. Length 1⅔, diam. ¾ mill. Aperture ½ mill. long.

Fig. 7.



Carychium exiguum.

Fig. 8.



Carychium exiguum, greatly enlarged.

Pupa exigua, Say, Journ. Acad. II, 375 (1822); ed. Binney, 26.—Gould, Bost. Journ. III, 398, pl. iii, f. 20 (1841); IV, 358 (1843); Invertebrata, 191, f. 122 (1841).—DeKay, New York Fauna, 49, pl. iv, f. 46 (1843).—Adams, Vermont Mollusca, 158, fig. (1842).

Bulimus exiguus, Binney, Terr. Moll. II, 286, pl. iiii; f. 1.

Carychium exiguum, Gould, in Terr. Moll. II, 286.—Chemnitz, ed. 2, 61, pl. i, f. 13, 14.—Pfeiffer, Mon. Auric. 165; Brit. Mus. Auric, 127; Wiegm. Arch. 1841, I, 224.—W. G. Binney. T. M. IV, 178.—Frauenfeld (1847), Akad. der Wiss. XIX, 79; Zool. Bot. Wien. IV, 10, pl. 1, f. 1 (1854).—Bourguignat, Mag. Zool. 1857, 209.

Carychium exile, H. C. Lea, Am. Journ. Sc. [1], XLII, 109, pl. i, f. 5 (1841).—Troschel, Ar. f. Nat. II, 128 (1843).

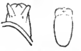
Carychium existelium, Bourguignat, *l. c.* 220.

Carychium euphæum, Bourguignat, *l. c.* 221.

Has been found in the New England, Northern and Middle States, in South Carolina, Arkansas, and Texas.

Animal colorless; tentacles stout, hyaline, one-third the length of the foot. The foot is short, thick, distinctly divided into two segments,[1] the anterior of which is bilobed, and projects, when the animal is in motion, considerably in advance of the head. Eyes oval, situated on the back, near the base of the tentacles. Its motions are very sluggish. It carries the shell directed horizontally; the shell is so transparent that the viscera of the animal may be seen through it.

Fig. 9.



Carychium exiguum.

It has been said to resemble *Carychium minimum*, of Müller, but neither the figure nor description, as given by Draparnaud, correspond with our shell.

It is found under stones and fragments of wood, and especially among moss, in damp places. It is the only species of this family inhabiting the interior, but though found over a wide extent of country, it still possesses a fondness for the sea in common with the other species of the family. Around Boston it is found at or below the surface in swamps, growing among mosses.

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[1] This does not agree with the generic description of *Carychium*.

2

This minute shell is well known in American cabinets as a *Pupa*. Say described it as such in 1822, though he mentions the probability of its being a *Carychium*. It has been described since that time as a *Pupa* by Gould, DeKay, and Adams, and catalogued among the species of the same genus by all the American writers who have mentioned it, until 1851, when its correct position was pointed out by Stimpson (Shells of New England) and Gould (Terr. Moll. II). The former places it in his family of *Melampidæ*.

Dr. Binney, in 1843 (Boston Journal, p. 106), considers it a *Pupa*. In the Terrestrial Mollusks he places it under *Bulimus*.

In 1852, Jay removed it from *Pupa* to *Carychium* (Cat. p. 263).

Notwithstanding its distinct generic peculiarities having been pointed out in 1851, we find the shell considered as a *Pupa* in several American catalogues as late even as 1857 (*vide* Boston Proc. VI, 128).

In Europe we find its true position pointed out by Pfeiffer as early as 1841, and by all subsequent writers.

In the fourth volume of the Terrestrial Mollusks I have given copies of the original descriptions of this species, and a figure of *C. exile*.

Lingual dentition (see p. 6).

Cat. No	No. of Sp	Locality.	From whom received.	Remarks.
8440	7	....	......	......

SPURIOUS SPECIES.

Carychium armigera, *contracta*, and *rupicola*, of SAY, and *C. corticaria*, of FERUSSAC (Tabl. Syst.), are species of *Pupa*.

SUBFAMILY MELAMPINÆ.

Animal amphibious, or living in brackish water. Shell with the inner lip plicate; outer lip straight and acute.

MELAMPUS, MONTF.

Foot bifid posteriorly. Shell ovate-conical; spire short, obtuse; aperture narrow, linear; inner lip with several transverse folds; outer lip acute, internally plicate.

Jaw — ?

Lingual membrane — ?

Numerous species of this genus have been met with, widely distributed over the world.

Melampus olivaceus, CPN.—Shell small, rather smooth, conical; spire depressed, obtusely angulated below the suture, which does not distinctly separate the whorls; color dirty white, with irregular patches or revolving lines of dark red or purplish; epidermis olive-colored; on young or very fresh specimens there are sometimes microscopic revolving lines near the base of the shell, and on the spire, which cross the delicate lines of growth so as to present under the microscope a granulated surface; whorls seven to nine, the upper ones distinguished only by means of the lens, and flattened; aperture long, equalling $\frac{4}{5}$ of the shell, edge variegated in color by the termination of the reddish bands on the white ground of the shell, within white; the outer lip is furnished with numerous sharp, white laminæ, in the specimens before me varying from 1 to 9; the parietal wall of the aperture is covered with an almost imperceptible shining, callus; there is one constant, prominent, elevated white tooth-like lamina revolving within the shell, which is usually placed within two smaller shorter ones; on the columella there is also a stouter lamina entering into the aperture, and passing outwards and curving downwards so as to join the termination of the labium. Length 13, diam. 18 mill.

Fig. 10.

Melampus olivaceus.

Melampus olivaceus, CARPENTER, in Reigen Cat. of British Museum, 178 (1856).—W. G. BINNEY, T. M. U. S. IV, 27, pl. lxxix, f. 8.

San Diego to Mazatlan (Reigen Cat.).

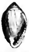
This is the first species of the family *Auriculacea* found on the Pacific coast of North America. There were numerous specimens found by M. Reigen, which Mr. Carpenter describes as distinguished generally by the olive-green epidermis, variegated with purplish-brown patches. I find the number of laminæ in the aperture very variable, but the two prominent ones on the labium are constant in all the individuals I have had the opportunity of examining.

The figure is taken from a specimen received from Mr. Carpenter.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8368	1	W. Coast.	......	......
3414	9	"	......	......
8550	3	"	......	Cabinet series.

Melampus bidentatus, SAY.—Shell imperforate, elliptically-ovate, rather thin, shining when perfect, but usually found much eroded; the surface is marked with longitudinal wrinkles, and very minute revolving striæ; horn-color, or grayish-red, often with revolving, narrow rufous bands, four or five in number; suture well marked; spire short, and usually obtuse, often somewhat eroded; whirls usually six, the upper ones flattened, the body whirl equalling about $\frac{5}{6}$ of the entire length of the shell, and obtusely angulated at its greatest width; aperture hardly oblique, very long and narrow, enlarging gradually towards the base, about $\frac{5}{6}$ the length of the shell; peristome very thin and sharp, not reflected, on the interior furnished with no laminæ, or with from one to seven; these laminæ are elongated, white, and do not reach the margin; they are usually separate, placed at irregular intervals, but sometimes are found on a longitudinal elevated, white callus; they enter but a short distance into the aperture; the parietal wall of the aperture is covered with a thin, shining, enamel-like callus, and bears on its lower half a single, white, prominent and transverse tooth, entering into the aperture; the columellar is also furnished with a white, tooth-like fold, commencing at the termination of the sharp peristome, and revolving upwards into the interior of the shell; this fold does not extend far into the aperture, as all the internal whirls and axis of the shell are early absorbed by the animal.

Fig. 11.



Melampus bidentatus.

Fig. 12.

Melampus bidentatus.

Length of an unusually large individual 13, breadth 7 millimetres.

Melampus bidentatus, SAY, Journ. Acad. Nat. Sc. Phila. II, 245 (1822); BINNEY'S ed. 84.—RUSSELL, Journ. Essex Co. Nat. Hist. Soc. I, part 2, 67 (1839).—PFEIFFER, Mon. Auric. Viv. 45 (excl. *Mel. borealis*).—W. G. BINNEY, T. M. IV, 156, pl. lxxv, f. 23.

Melampus biplicatus, PFEIFFER, Mon. Auric. Viv. 21; Br. Mus. 14.

Melampus? jaumei, PFEIFFER, Mon. Auric. Viv. 25; Brit. Mus. Cat. 18.

Auricula cornea, DESHAYES, Encycl. Méth. II, 90 (1830); IB. in LAM. ed. 2, VIII, 339; ed. 3, III, 390 (1839).

Auricula bidentata, Gould, Inv. Mass. 197, f. 131 (1841).—DeKay, N. Y. Moll. 57, t. v, f. 92, 1, 2, 3 (1843).—Küster, Chemn. ed. 2, Auric. 41, pl. vi, f. 7–11.

Not *Auricula bidens*, Potiez et Michaud, Gal. 201, pl. xx, f. 9, 10.

Auricula jaumei, Mittre, Rev. Zool. (Mars, 1841), 66.

Auricula biplicata, Deshayes, Encycl. Méth. II, 91.

Melampus bidentatus, var. *lineatus*, Say, p 46 of ed. Binney.

Melampus bidentatus, β, Pfeiffer, Mon. Auric. 46.—Var. a. DeKay, *l. c.*

Along the whole coast from New England[1] to Texas. A very common shell among the grass of salt marshes near high water mark.

Animal about as long as the shell, and the foot is transversely bifid; tentacula somewhat wrinkled, cylindrical, rather smaller towards the tips, which are obtuse or rounded; eyes placed at the inner base of the tentacula; rostrum somewhat wrinkled, nearly as long as the tentacula, bilobate before; foot, anterior segment emarginate behind, posterior segment bifid at the extremity; all above, with the exception of the tentacula and rostrum, glabrous, reddish-brown, beneath paler. (*Say.*)

The shell when young is quite pretty, being shining and often variegated by the revolving bands. But few mature shells are met with in a perfect condition. They are usually much eroded. From the toothless outer lip to that bearing a heavy callus ridged with transverse laminæ, every intermediate variety is found. The absence of the laminæ is equally common in mature and young shells.

Authentic specimens of this species are still preserved in the collection of the Academy of Natural Sciences of Philadelphia.

The original descriptions of Mittre and Deshayes are given in Terr. Moll. IV. I have seen authentic specimens of neither of their shells. The descriptions are merely copied by Pfeiffer, in the works referred to in the synonymy.

Say designates by the name of *lineatus*, a form peculiar for its revolving lines or bands and more narrow base of the aperture (*vide* Binn. ed. p. 85). I have met with none sufficiently marked to form a variety, much less a distinct species. The revolving lines are commonly found on young specimens. DeKay mentions this as var. α, Pfeiffer as β. The latter author also describes a var. γ:—

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[1] Gould mentions its being said to have been found living with a *Planorbis* at Windsor, Vt. If so, it must be adapted to a remarkable difference of station, being usually found near the sea. Pfeiffer also gives Vermont as the habitat, probably on the above authority.

Fig. 13.

M. bidentatus, var. *lineatus*.

> Last whirl sub-excavated below the suture, minutely spirally striated; lip with a white ridge of callus within the dark-colored margin, with from 6–10 regular folds.
>
> Georgia. (*Pfeiffer.*)

He quotes in the synonymy of this variety *Mel. borealis*, Conrad, of Cuming's collection. Conrad's species is much more likely to be *Alexia myosotis* than any variety of *Mel. bidentatus*.

Potiez & Michaud describe and figure quite a distinct shell under the name of *Auricula bidens*, Say.

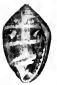
Stimpson gives precedence to Deshayes's name *corneus*. Say's name has eight years' priority, and is not pre-occupied in the genus *Melampus*. It was while treated as an *Auricula* that any question existed in regard to its specific name.

Pl. 75, Fig. 23, of the Terrestrial Mollusks, IV., represents a specimen not furnished with laminæ within the peristome.

The date of publication of this species is erroneously quoted by Pfeiffer as 1821. The title-page of the first part of Vol. II of the Academy Proceedings bears this date. The description was actually published at the date given by me.

Cat. No.	No. of Sp	Locality.	From whom received.	Remarks.
8436	8	Georgia.	Dr. J. Lewis.	……
8437	8	Indianola, Tex.	G. Wurdemann.	……
8438	12	Charleston, S. C.	Lieut. Kurtz.	……
8439	10	Indianola, Tex.	……	……
8441	3	Charleston, S. C.	Lieut. Kurtz.	……
8800	20+	St. Simon's Island, Ga.	……	……
8801	100?	Massachusetts.	W. Stimpson.	……
8804	5	Key West.	……	……
8822	11	Indian Key, Fla.	G. Wurdemann.	……
8823	3	Texas.	Capt. Pope.	……

Fig. 14.



Melampus flavus, twice natural size.

Melampus flavus, Gmel.—Shell imperforate, obconic, smooth, chestnut-colored, with three light, narrow bands; spire short, convex conic; suture slightly impressed; whirls from nine to ten, the upper ones flattened, the last about equalling three-fourths of the length of the shell, arcuately ridged below; aperture subvertical, narrow, angulated below; one deep parietal fold, one subvertical, stout, columellar fold, extended towards the base; peristome straight, acute, its outer margin reddish, thickened with white within and furnished with ten short, transverse ribs, its columellar portion expanding and callous. Length 12, breadth $8\frac{2}{3}$; length of aperture $9\frac{1}{2}$, breadth at the middle 3 millimetres.

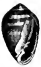
Lister, Hist. t. dcccxxxiv, f. 60.—Favanne, Conch. t. lxv, f. H, 1.
Auricula midæ parva, &c., Mart. & Chemn. II, 119, 126, t. xliii, f. 445.
Voluta, n. 106, Schröter, Einl. I, 272.
Voluta flava, Gmelin, Syst. 3436, No. 5.—Dillwyn, Cat. I, 506, n. 17.
Voluta flammea, γ, Gmelin, *l. c.* 3435, n. 1.
Bulimus monile, Bruguiere, Encycl. Méth. I, 338, n. 70.
Melampa monile, Schweigger, Handb. 739.
Conovulus monile, Goldfus, Hand. 657.
Conovulus flavus, Anton, Verz. 1776.
Auricula monile, Ferussac, Podr. 105.—Lamarck, An. sans Vert. VI, 2, 141; ed. Desh. VIII, 333.—Küster in Chemn. ed. 2, Auric. 30, pl. iv, f. 7–9.
Auricula flava, Deshayes in Lam. VIII, 33.—Petit, Journ. Conch. II, 427 (1851).
Auricula coniformis, Orbigny, Moll. Cuba.
Melampus monile, Lowe, Zool. Journ. V, 292.
Melampus flavus, Adams, Contr. 42, 186.—Poey, Mem. I, 394.—Pfeiffer, Mon. Auric. Viv. 21; Brit. Mus. Auric. 14.—W. G. Binney, T. M. IV, 186, wood-cut.
Melampus torosa, Mörch, Cat. Yoldi, 38.
Melampus monilis, Shuttleworth, Diag. 7, 162.

A West Indian species, found in Florida by Mr. Bartlett.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8542	1	Florida.	W. G. Binney.	Cabinet series.

Melampus coffea, Lin. — Shell imperforate, cone-shaped, very solid and heavy, smooth and shining in fresh specimens, with delicate wrinkles of growth, and very numerous microscopic revolving lines; light fawn-color when deprived of its russet epidermis, with three or four revolving bands of white on the body whirl, of which the uppermost is broadest; suture moderate; spire short, conic, apex black, shining, pointed; whirls from nine to ten, the upper ones flattened, the last obtusely angulated below the suture, $\frac{13}{15}$ the length of the entire shell; aperture subvertical, long and narrow, gradually widening towards the base of the shell, about $\frac{11}{15}$ the entire length of the shell; peristome acute, not reflected, but thickened within by a heavy white callus, extending as high up as the carina of the body whirl; on this callus are from fifteen to twenty-two white, transverse laminæ or ridges, not reaching the edge of the peristome, and not

Fig. 15.



Melampus coffeus, natural size.

entering far into the aperture; sometimes there is a second and even third series of these laminæ visible within the aperture; on the parietal wall are two elevated, white, entering folds, the upper one much more prominent; the columella is covered with a shining, brown callosity, and furnished with one rather prominent fold, which commences at the termination of the peristome, and winds upwards into the interior of the shell; the interior whirls and axis are entirely absorbed. Diameter of a large specimen, 10, length 19 diameters.

Bulla coffea, Linnæus, Syst. Nat. X, 729.
Voluta coffea, Linnæus, Syst. Nat. XII, 1187.—Schröter, Einleit. II, 200.—Gmelin, Syst. Nat. XIII, 3438.—Dillwyn, Descr. Cat. I, 506.
Voluta minuta, Gmelin, Syst. 3436, ex parte.—Dillwyn, *l. c.* 506.
Auricula midæ parva, fusca, albo-fasciata, Martini et Chemnitz, II, 119, pl. xliii, f. 445? (or *Mel. flavus*?).
Ellobium barbadense, Bolten, Mus. 106, ed. nov. p. 74?
Bulimus coniformis, Bruguière, Encycl. Méth. I, 339.
Melampus coniformis, Montfort, Conch. Syst. II, 318.—Lowe, Zool. Journ. V, 292.
Melampus coffeus, Adams, Gen. Rec. Moll. t. lxxxii, f. 7, 7*a* (no desc.).—Pfeiffer, Mon. Aur. 28; Br. Mus. Cat. 19.—W. G. Binney, T. M. IV, 162, pl. lxxv, f. 21, 25.
Melampa minuta, Schweigger, Handb. 739.
Tornatelle coniforme, Blainville, Dict. Sc. Nat. pl. Malac. liv, f. 4.
Auricula coniformis, Lamarck, Hist. an. s. Vert. VI.—Deshayes in Lam. VIII, 332; ed. 3, III, 387.—Potiez et Michaud, Gal. I, 202.—Reeve, Conch. Syst. II, t. clxxxvii, f. 7 (teste Pfr.).—Sowerby, Conch. Man. 77, f. 298?—Chemnitz, ed. 2; Auric. 31, t. iv, f. 14–17.
Auricula ovula, Orbigny, Moll. Cub. I, 187, t. xiii, f. 4–7 (1853).
Conovulus coniformis, Lamarck, Encycl. Méth. t. cccclix, f. 2 (no desc.).—Woodward, Man. Moll. 173 t. xii, f. 37 (1854).

The only specimens I have seen were collected in Florida, by Mr. Bartlett, more than ten years ago. It is a well known and very common shell in the West Indies. Referred also to Mexico by Pfeiffer.

Mr. Thomson sent me specimens from New Bedford, where they were probably introduced by the schooners of the live-oak trade running to Florida.

Animal (see T. M. U. S. IV, pl. 75, fig. 21) about the length of the shell; tentacles short, pointed, eyes at their interior base; proboscis extending beyond the head, bilobate, bluntly terminating; posterior termination of the foot short, bifid, color dark-brown.

Figure 25 of plate 75, of Terr. Moll. IV, is a fac-simile of

Orbigny's figure of *Auricula ovula*. It is a good representation of our Florida shells.

West Indian specimens are well known in cabinets. I know of no American specimens, with the exception of the few collected by Mr. Bartlett.

Plate 79, fig. 6, of T. M. IV, may represent a variety of this species. It is from Texas.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8821	5	Indian Key, Fla.	O. Wardemann.	Cab. ser. Var. and sp. dist.? *Vide* T. M. IV.
8824	1	Texas.	Capt. Pope.	Cab. ser. Var. and sp. dist ? *Vide* T. M. IV.

SPURIOUS SPECIES OF MELAMPUS.

Melampus borealis, CONRAD, I have referred to *Alexia myosotis*.

Melampus denticulatus, STIMPSON, is also identical with *Alexia myosotis*.

Melampus redfieldi, PFR. (See T. M. IV, 170.)

Melampus pusillus, *floridanus*, and *cingulatus* (see *Tralia*).

Melampus obliquus, SAY.—Obconic, reddish brown, rather thick; spire very little elevated; whirls eight or nine, wrinkled across; labium with two very distinct teeth, and an intermediate and equidistant, slight obtuse prominence; inferior tooth very oblique, terminating at the base; labrum with about eight teeth or striæ, which terminate on the margin; base of the aperture a little contracted by the basal tooth. Length more than seven-twentieths of an inch.

I am indebted to Mr. Stephen Elliott for this species, who obtained it on the coast of South Carolina. It is closely allied to *Bulimus monile*, Brug., but it has no appearance of bands, which distinguish that shell. In the collection of the Academy are specimens from the West Indies. (*Say.*)

Melampus obliquus, SAY, Journal Acad. Nat. Sc. Phila. II, 377 (Dec. 1822); BINN. ed. 27.—W. G. BINNEY, T. M. IV, 167.—PFEIFFER, Mon. Auric. Viv. 30.

Auricula obliqua, DEKAY, N. Y. Moll. 58 (1843).

It is not now known what shell Say had in view when the above description was written. No authentic specimen is preserved, and no author has seen any shell from that locality answering to the characters laid down. DeKay mentions it among the extra-limital species in his report, his words being nearly a repetition of Say's. Pfeiffer repeats Say's words, and suggests the identity of the species with *Melampus coffea*. Say being familiar with that shell (*M. coniformis*, *vide* ed. Binn. p. 85), it seems hardly probable he would have described a variety of it.

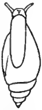
The question must remain undecided until we are better acquainted with the species of the South Carolina coast.

FOSSIL SPECIES.

Melampus priscus, MEEK, Phila. Acad. Nat. Sc. Proc. 1860, 315.
Melampus (Ensiphorus) longidens, CONRAD, Pr. A. N. Sc. Phila. 1862, 584.

TRALIA, GRAY.

Fig. 16.



Animal of *Tralia*,[1] enlarged.

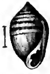
Foot posteriorly acute, entire.

Shell ovate, smooth; spire elevated; aperture narrow, linear, dilated anteriorly; inner lip usually with three oblique plaits; outer lip acute, sinuated posteriorly, internally with one or more transverse, elevated ridges.

This genus differs from *Melampus* in having the foot entire posteriorly, not bifid. It is not admitted by Pfeiffer.

Tralia floridana, SHUTTL.—Shell imperforate, ventricose, fusiform, thin, smooth, grayish, with varying chestnut bands; spire regularly conic, acute; suture linear; whirls ten, flattened, the upper ones radiately striate, the last comprising three-fifths of the length of the shell, obsoletely angulated above, and very much smaller at its base; aperture subvertical, narrow, angular; two parietal plicæ, one strong, one on the columella, obliquely continued towards the base; peristome acute, its right side in adult specimens armed with transverse, white, subequal folds, its columellar portions both short and callous. Length 7½, diameter 4⅛; aperture in length almost 5, in breadth 1⅓ millimetres.

Fig. 17.



Tralia floridana.

Auricula floridana, SHUTTLEWORTH, MSS.
Melampus floridanus (*Tralia*), ADAMS, Pr. Zool. Soc. II, 1854 (no desc.).—PFEIFFER, Malak. Blatt. (1854); Mon. Auric. Viv. 36; Brit. Mus. Cat. 25.—W. G. BINNEY, T. M. IV, 165, pl. lxxv, f. 30.

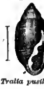
Found at Florida Keys.

Cat. No.	No. of Sp	Locality.	From whom received.	Remarks.
6541	2	Florida.	W. O. Binney.	Cabinet series.

[1] I do not know what species this represents. It was drawn from nature by Dr. Stimpson, in Charleston harbor.

Tralia pusilla, Gmel.—Shell imperforate, lengthened-ovate, solid, shining, smooth, marked with microscopic revolving lines, most easily detected on the spire; reddish-brown, with lighter, hardly perceptible revolving bands; suture moderate, less ragged than in the other species; spire elongate-conic; apex acute, shining, black; whorls six to seven, the upper ones flattened, the body whorl obtusely carinated, regularly decreasing in diameter towards the base, and equalling about $\frac{1}{2}\frac{2}{3}$ the length of the shell; aperture subvertical, narrow, rapidly widening towards its base, and equalling in length about $\frac{1}{2}\frac{2}{3}$ of the entire shell; peristome simple, acute, within thickened by callus, and furnished with a rather blunt, short, transverse, not very prominent lamina; the basal termination of the peristome is appressed to the shell, and imperceptibly terminates in a columellar lamina which ascends and winds into the aperture; the columella and parietal wall are covered with a shining callus; there are two parietal teeth, which are white, and enter into the aperture of the shell, the lower one being much the smaller. Internal septæ absorbed. Greatest diameter 5, length 11 millimetres.

Fig. 18.



Tralia pusilla.

Auricula midæ parva fusca unicolor, Martini & Chemnitz, II, 119, t. xliii, f. 446.—Favanne, t. lxv, f. H, 4 (teste Pfr.).
Voluta, n. 108, Schröter, Einl. I, 273.
Voluta pusilla, Gmelin, Syst. 3436 (teste Pfr.).—Dillwyn, Cat. I, 507.—Wood, Ind. pl. xix, f. 20.
Voluta triplicata, Donovan, Brit. Shells, V, pl. cxxxviii (1808).—Montagu, Test. Brit. Suppl. 99.—Dillwyn, Cat. 507.—Wood, Ind. pl. xix, f. 19.
Bulimus ovulus, Bruguiere, Encycl. Méth. I, 339.
Melampa ovulum, Schweigger, Handb. 739 (teste Pfr.).
Auricula ovula (*Conovula*), Ferussac, Tabl. Syst. 108 (absq. desc.).
Auricula nitens, Lamarck, An. s. Vert. VI, 2, p. 141.—Deshayes in Lam. VIII, 332; ed. 3, III, 387.—Chemnitz, ed. 2, Auric. 18. pl. ii, f. 11–13.
Auricula pusilla, Deshayes in Lam. VIII, 332.
Conovulus nitens, Voight in Cuv. Thierr. III, 112 (teste Pfr.).
Conovulus pusillus, Anton, Verz. 48.
Melampus pusillus, Pfeiffer, Monog. Auric. Viv. 48; Brit. Mus. Auric. 34.—W. G. Binney, T. M. 168, pl. lxxv, f. 29.
Tralia pusilla, H. et A. Adams, Gen. Rec. Moll. II (Sept. 1855), 244, pl. lxxxii, f. 8.

The only American specimens I have seen are in my collection. I detected them among marine shells and sand, collected in Florida by Mr. Bartlett.

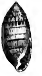
This species is well known in cabinets by specimens from the

West Indian Islands, in several of which it exists. Pfeiffer also refers it to the Sandwich Islands.

It is readily distinguished by its shining, mahogany-colored shell. It varies less than most of the *Melampi*.

Tralia cingulata, Pfr.—Shell imperforate, fusiform, heavy and thick, shining, polished, with numerous microscopic revolving lines, most prominent on the last whirl; brownish, with numerous irregularly wide, white revolving bands; spire convex-conic, terminating in an acute transparent point; suture simple; whirls ten, the upper ones flattened and narrow, the last one tapering towards the base, and equalling about two-thirds the length of the shell; aperture hardly oblique, very narrow, divided at its base by a stout, sharp columellar fold, which ascends and winds obliquely into the aperture; peristome simple, acute, armed within with from six to eight elongated laminæ, not quite reaching the edge of the lip, the lower one being most fully developed. Length of the specimen before me 11, breadth 5; length of aperture 6 millimetres.

Fig. 19.



Tralia cingulata, 2½ natural size.

Auricula cingulata, Pfeiffer in Wiegm. Arch. f. Nat. 1840, I, 251.—Chemnitz, ed. 2, Auric. 40, t. xi, f. 4–6.
Auricula oliva, Orbigny, Moll. Cub. I, 189, t. xii, f. 8–10.
Auricula stenostoma, Küster, olim, in [illegible]
Melampus cingulatus, Pfeiffer, Mon. Auric. Viv. 18; Brit. Mus. Cat.—W. G. Binney, T. M. IV, 161, pl. lxxv, f. 12–13.
Tralia, H. & A. Ad.

The only American specimens of this species I have seen, were collected in Florida by Mr. Bartlett. The species is also found in Cuba, Jamaica, and Porto Rico.

Cat. No.	No. of Sp.	Locality.	From whom received	Remarks.
8809	5	Florida.	W. Stimpson.	Cabinet series.

LEUCONIA, Gray.

Foot divided inferiorly by a transverse groove.

Shell ovate-oblong, imperforate, smooth; spire conical; aperture elongate, oval; inner lip with two plaits anteriorly; outer lip smooth internally, the margin simple, acute.

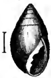
Of the six species of this genus described, two are found in the West Indies, three in Europe, and one of doubtful identity is referred to the United States.

Leuconia sayii, Küster.—Shell small, conic-ovate, shining, horn-colored, striate; spire acute, broadly conic, whirls five, rather convex; aperture oblong, columella biplicate. Length 2½ lines, diam. 1½.

United States. (*Küster.*)

Auricula sayii, Küster in Chemn. ed. 2, 12, pl. vi, f. 14, 15.
Leuconia sayii, Pfeiffer, Mon. Auric. 157; Brit. Mus. Auric. 170.—W. G. Binney, Terr. Moll. IV, 177, pl. lxxv, f. 34.

Fig. 20.



Leuconia sayii.

The above is Küster's description. The figure I give is a fac-simile of one of his. This is the only information I have been able to obtain with regard to the species. It has not been described by any other author but Pfeiffer, who merely quotes the above description, not having ever seen the shell.

Küster's figure represents no known American shell; there exists, however, a strong resemblance between it and his figure of *Alexia myosotis.* His original specimen may have been a variety of that species.

Pfeiffer compares the species with *Melampus infrequens*, Ad.

PEDIPES, Adanson.

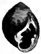
Foot divided inferiorly by a transverse groove.

Shell subglobose, imperforate, transversely striated; spire short, obtuse; aperture narrow; inner lip flattened, excavated, with three plaits, the posterior the largest; outer lip posteriorly sinuated, with two teeth internally; margin acute.

Species of *Pedipes* have been found at Panama, in Africa, the West Indies, Madeira, and Isle of France. They are said to inhabit crevices of rocks, especially those exposed to the full force of the tide. The generic name was suggested by the peculiar mode of progression. When the animal walks, the hind part of the foot is fixed, and the fore part, which is separated from the hind part by an extensible groove, is advanced, and the hind half is then drawn forwards so as to touch the anterior half, and so progression is effected by a series of little steps. This movement is executed with such quickness that the *Pedipes* is one of the most agile of mollusks.

Pedipes lirata, W. G. BINNEY.—Shell imperforate, globose-conic, solid, shining, straw-colored, regularly marked with revolving ridges; spire short, depressed, apex obtuse; whirls three, the upper ones short, the lower one about equalling five-sixths the length of the shell; aperture semicircular, its parietal wall covered with shining callus, and furnished with a thick, elevated, hooked and entering fold; columella furnished with two thick, acute, tooth-like processes, placed side by side; peristome acute, furnished on its interior with a shining callus, which is protracted into a high tubercle at its middle. Greater diameter 2½, length 3⅓; length of the aperture 2½ mill.

Fig. 21.



Pedipes lirata, 4 times nat. size.

Pedipes lirata, W. G. BINNEY, Phila. Acad. Nat. Sc. Proc. 1860, 154.

Cape San Lucas, Lower California.

The specimen figured is the only one found. It may, perhaps, be somewhat related to *P. angulata*, Adams, of Panama, which I have not seen.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8567	1	Cape St. Lucas.	John Xantus. .	Cabinet series. Type.

BLAUNERIA, SHUTTL.

Shell imperforate, oblong-turreted, thin; aperture narrow, elongated; inner lip with a single plait, columella subtruncate; outer lip simple, straight.

Foot somewhat truncated in front, pointed behind, long as the shell's aperture; head large, projecting beyond the foot, forming a snout with dilated lips; tentacles short, cylindrical, eyes at their superior base.

But one species of this genus is known, the *B. pellucida.* It is one of those shells whose generic position cannot be ascertained without a knowledge of the characters of the animal. It was placed among the *Helicidæ* as *Achatina* and *Tornatellina*, as a *Glandina* among the *Oleacinidæ*, and among the Pectinibranchiates as *Odostomia*, until it was ascertained by Dr. Gundlach to belong to the *Auriculidæ*.

Blauneria pellucida, Pfr.—Shell sinistral, ovate-lanceolate, acuminate, pellucid, highly polished and glistening. Whirls seven, very oblique, scarcely convex, the last one somewhat ventricose towards the base, about two-thirds the length of the shell; aperture narrow ovate, acutely prolonged posteriorly; lip simple; turning up the columella it becomes thickened, and winds into the aperture in the form of a tooth-like lamella. Length 5 mill.; breadth 1⅔; aperture 2 mill. long.

Fig. 22.

Blauneria pellucida.

Achatina (?) *pellucida,* Pfeiffer in Wiegm. Archiv. 1840, I, 252.—Gould in Binn. Terr. Moll. II, 294, pl. liii, f. 2.
Tornatellina cubensis, Pfeiffer, Symb. II, 130; Monog. Helic. Viv. II, 391.—Chemnitz, ed. 2, Pupa. 151, pl. xviii, f. 16, 17.
Blauneria pellucida, Pfeiffer, Malak. Bl. 1854; Mon. Auric. Viv. 153; Brit. Mus. Cat. 110.—W. G. Binney, T. M. IV, 175.
Odostomia? cubensis, Poey, Mem. I, 394.

Found in Florida, among small shells drifted in the sand.

It has been detected in Cuba, Jamaica, and Porto Rico, and has been introduced into England.

Binney is the only American author who mentions its existence in this country. He places it under *Achatina.* Gould, in Terr. Moll., leaves it in that genus provisionally, mentioning the doubt existing concerning it.

Spurious Species of Auriculidæ.

Otina zonata, Pfeiffer. *Vide Velutina zonata,* p. 22.

Family OTINIDÆ.

Lingual membrane, as in *Auriculidæ,* broad, teeth in numerous cross series. Head large, broad, obtuse, mouth vertically cloven, furnished with distinct jaws. Tentacles flattened, eyes at the upper part of their base.

Shell ear-shaped, colored; columellar margin simple; outer lip simple and acute.

Animal amphibious, living near the sea.

The species of this small family differ from the *Auriculidæ* in having flattened tentacles, and from the *Limnæidæ* in having the eyes on the upper part of the base of the tentacles, instead of at the inner edge of the base, and in having colored shells.

SPURIOUS SPECIES OF OTINIDÆ.

Fig. 23.

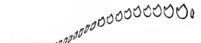
Velutina zonata.

Velutina zonata, GOULD, whose figure I copy (Invert. p. 242), is referred to this family under the name of *Morvillia zonata*, Gray (see Gen Rec. Moll. II, 645). It is a deep-water shell, without doubt belonging to *Velutina*. Pfeiffer describes it also among the *Otinea*, as *Otina zonata* (Mon. Auric. p. 12).

FAMILY LIMNÆIDÆ.

Lingual membrane armed with numerous, quadrate teeth, arranged in transverse rows, the central minute, the laterals uncinated or simply denticulated. Head with a broad, short muzzle, dilated at the end; mouth with one or more jaws; tentacles contractile, flattened or subulate, with the eyes sessile at their inner bases. Mantle margin variously modified; respiratory orifice at the right side. Foot flattened, lanceolate or ovate. Excretory orifices on the left side of the neck. Sexes united; male and female organs with separate orifices, on the right or left side.

Fig. 24.



Lingual dentition of *Ancylus newberryi*.

Shell of a varied form, thin, horn-colored, usually with an oblique fold on the columella, and with the outer lip simple and acute.

Animal fresh-water, living in the water, usually coming to the surface to respire the free air.

The *Limnæidæ* are found in every quarter of the globe; but in North America most of the genera are represented, excepting *Chilina*, *Camptoceras*, *Amphipeplea*, *Latia*, &c. They are more plenty in species and individuals in the more temperate portions of the continent. Especially among the innumerable lakes of the British possessions do the large species flourish.

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They are strictly aquatic in their habits, abounding in the small quiet streams and stagnant ponds, feeding exclusively on vegetable substances. They usually come to the surface to breathe the free air, but their organs of respiration must be adapted, in some species at least, to breathing through the medium of water, as they are occasionally found in circumstances precluding any possibility of an approach to the surface.

Their eggs are laid in clusters, surrounded by a gelatinous matter.

Many of the species possess the power of gliding along the surface of the water, shell downwards, and letting themselves down by means of a gelatinous thread.

From the fact of my finding young individuals only in the spring, and numerous dead full-grown shells during the late autumn and winter, I presume they arrive at maturity in one season. They are active during the spring, summer, and autumn, but bury themselves in the mud during winter, at least in the Northern States.

The *Limnæidæ* have been grouped by some authors according to the number of their horny jaws; but in the present stage of knowledge of them it seems to me preferable to adopt that division into subfamilies based upon the form of the shell, which is found to be spiral and elongate, spiral and flattened, or non-spiral and simply patelliform.

The shells of some of the various genera present considerable difference in form, but their characters are not as well marked or reliable as in the *Helicidæ*. I have therefore given, under the genus, a description of the typical form, leaving to the subgenera the descriptions of the various diverging forms.

So variable are the species in each of the American genera, and so imperfect is our knowledge of them, I have not attempted a full description of each species at this time. It seems best to me to give all the original descriptions both of true species and synonyms (translated when not in English), and a fac-simile of the original figure of each. My work must therefore be considered rather a report on the present state of our knowledge of the family than an exhaustive monograph. I am in hopes of obtaining material for a more perfect work at some future day.

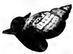
SUBFAMILY LIMNÆINÆ.

Shell spiral, more or less elongated, the last whirl large; aperture oblong.

LIMNÆA, LAMARCK.

Tentacles flattened and triangular. Mantle with the front edge thickened. Foot short, rounded. Shell dextral, spiral, oblong, translucent, horn-colored; spire acute, more or less produced, last whirl ventricose; aperture large, wide, rounded in front; inner lip with an oblique fold; outer lip simple.

Fig. 25.



Animal of *Limnæa desidiosa.*

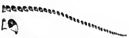
Jaws three, smooth; one upper, large, transversely oblong or ovate; two lateral, rudimentary, narrow, convex.

Lingual membrane (of *L. columella*) broad, teeth crowded, numerous; central narrow, long, apex attenuated, recurved; laterals broad, blunt, apex recurved, denticulated.

Fig. 26.

Jaws of *L. columella.*

Fig. 27.



Lingual membrane of *L. columella.*

This genus is found over almost the whole world, but prefers the more temperate portions of it. In North America, likewise, it is found in greater abundance and perfection in the lake region of the United States, and still more so in the British possessions. In the States bordering on the Gulf, and in Mexico, it is hardly represented.

The geographical distribution of the species is but little known. It seems certain that the boreal regions are inhabited by several species common to similar latitudes in Asia and Europe, such as *L. stagnalis* and *L. palustris.*

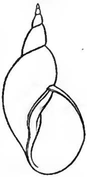
The name *Limnæa* is now universally adopted for this genus

It is useless, therefore, to refer here to the thirty synonyms quoted by Hermannsen.[1]

As a subgeneric name for the typical *Limnæa*, *Lymnus*, Montf. has priority—*Stagnicola*, Leach, being a synonym.

Limnæa stagnalis, Lin.— Shell elongated-ventricose; volutions six; spire regularly attenuated to an acute tip, rather shorter than the aperture; body whirl dilated, proportionally large; aperture ample; columella with the sinus of the fold profound, callus perfectly appressed upon the shell to the base.

Fig. 28.



Limnæa appressa, Say.

Inhabits Lake Superior.

This shell exhibits very much the appearance of *L. stagnalis*, but its body whirl is less proportionally dilated. The callus of the labrum is perfectly appressed to the surface of the whirl even to the base, exactly as in *stagnalis*. I have seen but a single weathered and broken specimen, which was sent me for examination by my friends Messrs. Collins and Barnes, of New York. It was found in Lake Superior, by Mr. Schoolcraft. Since writing the above, Mr. Jessup presented me with several specimens, which he collected in Canandaigua and Cayuga Lakes. (*Say. L. appressa.*)

Limnæa jugularis, Say, Nich. Encycl. 1817, 1818, 1819; ed. Binney, p. 46.—Haldeman, Mon. 16, pl. iv (1841).—DeKay, N. Y. Moll. 74, pl. v, f. 81 (1843).—Küster, Ch. ed. 2, p. 3, pl. 1, f. 7.

Limnæa appressa, Say, Journ. Acad. Nat. Sc. II, 168 (1818); Binney's ed. 66.—Haldeman, Mon. 18, pl. v (1842).—Adams, Shells of Vermont, 153 (pamphlet 3), (1842).—DeKay, N. Y. Moll. 74 (1843).—Küster, Ch. ed. 2, 4, pl. 1, f. 8–9.

Limnæa stagnalis, Linnæus, &c.—Sheppard (1829), Tr. Lit. Hist. Soc. Quebec, I, 196.—Kirtland, Am. Journ. Sc. [1], XXXI, 35, f. 10; Ohio Report, 200.—Anon. Can. Nat. II, 196, f. 1, 2, 1857.

Limnæa speciosa, Ziegler of Rossmässler, Icon. pt. 2, p. 96; pl. ii, f. 50 (1835).

This species ranges from Vermont, through the northern tier of States, to the Pacific Ocean. It is also found in Oregon and southern Utah, though it occurs most plentifully in the lake region of British America. Specimens of it have been collected for the Smithsonian Institution by Mr. Kennicott, at Fort Resolution and Fort Simpson, and at Moose Factory, by Mr. Drexler.

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[1] H. & A. Adams suggest the use of Klein's name *Auricula*, he being the first to notice and describe the genus. I protest against the use of his names in preference to the well-established names of authors who truly understood and followed the Linnæan system of generic nomenclature. (See Sill. Am. Journ. [2], XXXV, 429.)

From the means of comparison at my disposal I have no doubt of the identity of the European *Limnæa stagnalis* with this shell. Their proving to be the same will add another to the list of circumpolar species common to the two continents.

Authentic specimens of Mr. Say's *L. appressa* are still preserved in the collection of the Philadelphia Academy. They correspond well, though smaller, with the figure of *appressa* (Fig. 28), which I have copied from Haldeman. I have seen no authentic specimen of Say's *L. jugularis*, but have no doubt of its identity with the shell he afterwards called *appressa*, not only from his comparison of *jugularis* to *stagnalis*, but from the tradition of the earlier collectors, who always have considered them nearly related, if not the same. Mr. Say's description of *jugularis*, in the third edition of Nicholson's Encyclopedia (which is reprinted in my edition of his works), is extremely unsatisfactory, and would hardly be referred to the shell before me, without the words used by him in the first edition. Both are now given.

> There is a species of this genus which resembles the *stagnalis* of Europe: we have named it *Limnæa jugularis*. Whirls about six, tapering; mouth within often brownish, lip white, column a little contracted in the middle; we have not a good specimen to describe or figure. (*Say, Nich. Encycl. first ed.*)

> There is a species of this genus that we have named *Limnæa jugularis*, and which, in consequence of its having been found but once, must be considered as a doubtful inhabitant of the United States. It may thus be described: Shell tapering; whirls about six; suture not deeply impressed; aperture hardly equal to half the length of the shell, but little dilated; within brownish, particularly on the column, which is contracted in the middle; outer lip white, and almost imperceptibly repand within; umbilicus very distinct. Length one inch. A specimen was also brought from the West Indies, by Mr. L'Herminier, of Charleston. (*Say, 3d ed. Nich. Encycl.*)

Haldeman admits *L. appressa* as a distinct species with doubt, but describes it as more attenuated, lighter in color, and having the spiral striæ better developed than the typical *jugularis*. One of his figures of the latter is copied in my figure (Fig. 29).

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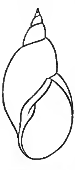
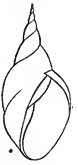
Fig. 29.



Limnæa jugularis.

Fig. 30.



Limnæa stagnalis.

Adams and DeKay describe *appressa* as a distinct species.

The shell has been figured roughly and described by Dr. Kirtland under the name of *L. stagnalis.* I here give a fac-simile of his figure, and a copy of his remarks, omitting Dillwyn's words.

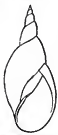
> After leaving Trumbull, we enter Portage County (Ohio). In this county we found a number of beautiful ponds, from each one of which flows a perennial stream. One which lies a few miles south of our route, in Stark County, called Congress Lake, was, until recently, the only known locality of the fine univalve shell, *Limnæa stagnalis.* It was discovered by Dr. K. in the course of the last season. I have one in my possession which is two inches in length, with the body whirl three-fourths of an inch in diameter. As this rare and elegant shell has not been figured or described by any American Conchologist, a drawing is given at figure 10. The description is copied from Dillwyn, and appears to be so similar to that of our own shell, that there can be no doubt of its identity with the European species, although it is a rare fact, and which scarcely again occurs in all our long list of land and fresh-water shells. Geoffroy calls it "Le Grand Buccin." (*Kirtland.*)

An anonymous writer in the Canadian Naturalist also refers the shell to *stagnalis*, giving a copy of a figure of that species in a foreign journal.

The species has also been described and figured, as the following copies show, by Rossmassler, under the name of *Limnæus speciosus*, Ziegl. Haldeman quotes this description in the synonymy of *jugularis*, but afterwards refers it to *L. appressa.*

> Shell imperforate, ovate-conical, with a long turreted acutely terminating spire, yellowish-brown, deeply striated, with very delicate striæ under the lens on the whole upper surface; seven whirls, the last not very ventricose, but only slightly arched; no trace of a margin above; the upper whirls form a very long and slenderly drawn-out spire; aperture ovate, acute above, on the left side cut out in a shallow heart shape; outer lip but slightly prominent, and very delicately imbricated; the columellar callus is quite thin and adheres so closely as to be distinguished almost

Fig. 31.



Limnæus speciosus.

wholly by its white color, and hardly by a perceptible elevation, leaving scarcely any trace of an umbilicus.

Animal ——?

Habitat.—In the fresh-water lakes of North America. I compared twenty specimens from Lake Erie which appeared perfectly adult and whose characters were constant. This species certainly much resembles *L. stagnalis;* but the invariable tawny color, the decided almost regular striation, the narrower aperture, the outer lip less curved and not prominent, and, finally, the delicate, closely adherent, white columellar callus sufficiently distinguish it. (*Rossmassler.*)

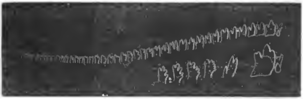
Moquin-Tandon (Moll. Fr. II, 471) places *L. appressa*, Say, in the synonymy of *L. stagnalis*, var. ζ, *roseolabiata* (*L. bicolor*, Mke, *L. stagnalis*, var. *obscurus*, Mke.).

Reeve (Brit. L. and Fr. W. Sh.) does not quote Say's species in the synonymy of *L. stagnalis*, but on p. 155 notices the marked degree of parallelism between, if not identity of, *L. limosa* and *L. catascopium*, *L. auricularia* and *L. macrostoma*,[1] *L. stagnalis* and *L. jugularis*, *L. palustris* and *L. elodes*, and *L. truncatula* and *L. desidiosa*.

Limnæa stagnalis is catalogued by Middendorf among the circumpolar species of Asia. It is found in Europe, Siberia, and Cashmere. Like many of our extreme northern species, it appears common to the three continents.

Fig. 32 represents the lingual dentition of an American specimen of *Limnæa jugularis*. The central tooth is small, narrow, conical. There are 40·1·40 teeth, arranged in a transverse, curving row, of variable form. There are 103 rows in all.

Fig. 32.



Lingual dentition of *Limnæa jugularis*.

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[1] Rather *L. ampla*.

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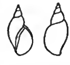
Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8301	5	Michigan.	......	......
8306	5	Ruby Valley.	Capt. J. H. Simpson.	......
8307	4	....	W. Stimpson.	......
8479	3	Lake Champlain.	W. G. Binney.	Cabinet series.
8954	3	Ft. Simpson, Br. Am.	R. Kennicott.	......
9063	30+	Hudson's Bay.	Drexler.	......
9067	50+	Grand Rapids, Mich.	Dr. J. Lewis.	......
8959	..	Ft. Resolution.	R. Kennicott.	......
8135	5	Ft. Simpson	"	......
9140	5	Moose Factory.	Drexler.	......
9175	50+	Vermont.	J. E. Chittenden.	......
9182	2	Black River, N. Y.	Gen. Totten.	......
9165	4	Milwaukee.	I. A. Lapham.	......
9154	6	Cayuga Inlet.	Mrs. H. W. Parker	......
8245	3	Milwaukee, Wis.	I. A. Lapham.	......
8246	3	Michigan.	......	......
8462	3	Southern Utah.	Capt. J. H. Simpson.	In al. with animals.
8473	2	Milwaukee, Wis.	I. A. Lapham.	......
9285	5	Isle la Crosse.	R. Kennicott.	......
9287	1	Otter Tail Creek, Minn.	"	......
9290	20+	Great Slave Lake.	"	......
9248	3	Lake Superior.	Dr. J. S. Newberry.	......
9250	2	"	"	......
9252	5	Rhett L., Col.	"	......
9244	5	....	......	......
9322	4	E. of Ft. Colville, W. T.	N. W. Bound. Surv.	......
9325	12	Near Ft. Anderson, lat. 68°	R. R. McFarland.	......

Limnæa lepida, GOULD. — Shell very fragile, elongated, very acutely conical, subumbilicate, pale horn-color; whirls five, oblique, moderately convex, forming an acuminated spire; suture moderately impressed; surface smooth and shining, lines of growth faint, and when examined by a magnifier they are found to be rendered somewhat zigzag by distant, revolving furrows, which cross them. Aperture large and expanded, nearly semicircular, half the length of the shell; outer lip expanded; columella having a very strongly marked sharp fold, and broadly covered with a thin callus, which not being closely appressed at the umbilical region, leaves a small chink. Length $\frac{3}{4}$, breadth $\frac{1}{4}$ inch.

Fig. 33.



Limnæa lepida.

Lake Vancouver, Oregon.

Most closely allied to *L. pallida*, Adams, but is much more delicate, the spire more acuminate, the aperture larger and expanded, the fold of the pillar more developed, and the surface well characterized, when closely examined, by the flexuose lines. The whirls are much more oblique and less convex than in *L. desidiosa*. (*Gould.*)

Limnæa lepida, GOULD, Proc. Boston S. N. H. II, 211 (1847); U. S. Ex. Ex. Moll. 121, f. 141, 141*a* (1852); Otia, 41.

The description and figure given above are both copied from Dr. Gould. The original specimens are preserved in the Smithsonian collection.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8571	::	Lake Vancouver, Or.	Com. Wilkes.	Cabinet series.

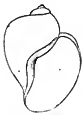
Subgenus **RADIX**, Montf.

Shell subovate, last whirl ventricose; aperture more than half the length of the shell, greatly expanded.

Gulnaria of Leach corresponds to this subgenus, but does not have priority. Klein describes a "Radix Bryoniæ" as a genus (?) at an earlier date than Montfort published, but I do not acknowledge him as authority. He did not use the Linnæan system of nomenclature. H. & A. Adams use Klein's name *Neritostoma*, but his description and figure refer rather to *Succinea*, which would prevent the use of the name, even if Klein were authority.

Limnæa ampla, Mighels.—Shell large, much inflated, suboval, rather thin, composed of five convex whirls, prominently shouldered at the upper part; epidermis of an obscure olivaceous green color; lines of accretion very fine and compact; transverse lines obscure, appearing serriform under a magnifier, giving the surface the appearance of very delicate lace work; suture deep, and in one specimen subcanaliculate; spire short and pointed when present; aperture oblong, very wide at the posterior part, but narrowing rapidly anteriorly and occupying rather more than two-thirds the length of the shell; labrum thin and somewhat reflected; labium broadly reflected, forming and partially covering an open and very deep umbilicus; columella fold very prominent; within it is of a light yellowish fawn color, with an obscure purplish zone, one line in breadth, and about two lines within the aperture. Length 1.3, breadth 1, height .8 inches. Divergence of the spire very variable.

Fig. 34.



Limnæa ampla.

Second Eagle Lake, Maine, N. lat. 47°.

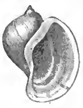
This extraordinary and beautiful species was discovered by Mr. Alexander W. Longfellow, civil engineer, while engaged with other gentlemen of the scientific corps in the exploration and survey of the northeastern boundary, in the summer of 1842. He informs me they were very abundant on the shore of the lake, but he had no means of preserving any more than four specimens, all of which are in my collection. No two of the specimens are exactly alike; but notwithstanding this and the remarkable difference between those represented in the plate, I doubt not they are specifically the same. It is allied to *L. decollata*, Nobis, but it is readily distinguished from that shell by its amplitude, by a proportionately larger penultimate whirl, by the reflected labrum, by a much broader labium, and by an open umbilicus, which is always entirely closed in *L. decollata.* I regard that represented by fig. *a* as the prevailing type of the species. Fig. *b* is a little shorter, and rather more tumid; fig. *c* represents a distorted specimen. (*Mighels.*)

Limnæa ampla, MIGHELS, Bost. Journ. N. H. IV, 347, pl. xvi, f. 1, *a*, *b*, *c* (Apr. 1843); Proc. I, 129 (Oct. 1843), not of HARTMANN.[1]—WHITEAVES, Can. Nat. (Apr. 1863), VIII, 112, f. 11.

This is a well-marked species, not easily confounded with any other. The description and Fig. 34 are copied from Mighels. Since their publication, the species seems to have been entirely unnoticed till Mr. Kennicott found it at Fort Simpson.

The European species most nearly related to *L. ampla* is *L. auricularia.* So strong is the resemblance between some forms of the two that their identity is almost suggested. I have, therefore, copied Moquin-Tandon's figure of *L. auricularia.*

Fig. 35.

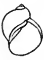


Limnæa auricularia.

Cat. No.	No. of Sp	Locality.	From whom received.	Remarks.
..	..	British America.	Kennicott.	......
9283	50+	Isle La Crosse.	"	......

Limnæa decollata, MIGHELS.—Shell very ventricose, rather thick, subovate or subrotund, in outline an irregular rhomboid; epidermis of an olivaceous green color, rather thin, deciduous; whirls two to three; spire very short, generally decollated; whole surface generally rather rough; striæ of growth coarse and fine alternately; transverse striæ on the body whirl sparse, interrupted, sometimes obsolete; body whirl composes almost the whole shell; aperture very large, subcampanulate; its length is very little greater than the breadth, and occupies more than two-thirds the length of the shell; labrum rather thin, simple; fold of the columella very prominent. Length .6, breadth .5, height .4 inch.

Fig. 36.



Limnæa decollata.

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[1] *Gulnaria ampla*, Hartmann, 1842, is referred by Reeve to *L. auricularia*. Should it prove a distinct species, our shell might be called *L. mighelsi.*

Animal dingy mouse-color, with a slight tinge of purple, covered with numerous microscopic, elongated white spots on every visible part of the surface, including the mouth and tentacula; foot of a chocolate color, rather broad, length rather greater than the aperture; habits sluggish. Cabinets of the Bost. Soc. N. H., Dr. Gould, S. S. Haldeman, J. G. Anthony, J. W. Mighels, and C. B. Adams.

Unity, Maine, discovered by Dr. Milliken of that town, to whom we are indebted for specimens.

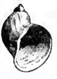
This odd but interesting shell is readily recognized by its rhomboidal aspect, wide aperture, and rather rough and distorted appearance. It is allied to *L. catascopium*, Say, but is distinct from that shell by having less whirls by two, and a much shorter spire; by being wider, and its divergence greater by more than thirty degrees. By some it has been supposed to be identical with *L. emarginata*, Say. This is impossible. *L. emarginata* is much more cylindrical, the divergence of its spire is scarcely half as great as that of our shell; it is much thinner, and has at least two more volutions. Our shell is also destitute of the "deep emargination" which distinguishes *L. emorginata*. (*Mighels & Adoms.*)

Limnæa decollato, MIGHELS, Proc. Bost. Soc. I, 49 (1841); Bost. Journ. IV, 4–5, 336, pl. iv, f. 13 (and ADAMS) (1842).

Limnæa catascopium, HALDEMAN, part, Mon. 52, pl. xiv, f. 1–3 (1842).

Limnæus decollotus, KÜSTER in Ch. ed. 2, 45, pl. viii, f. 11–14.

Fig. 37.



Limnæa decollata.

Found around Lake of the Woods, in Maine and Connecticut.

Haldeman and DeKay refer this species to *L. catascopium*. I have given the original description and figure above. No. 9132, presented by Prof. Haldeman, were by him received directly from Mighels. One is figured in Fig. 37.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8300	8	Lake of the Woods.	R. Kennicott.	......
8481	1	Maine.	W. G. Binney.	Cabinet series.
9132	6	"	Haldeman.	From Mighels.

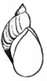
Limnæa columella, SAY.—Shell thin, fragile, horn-color; whirls four, longitudinally wrinkled. Spire prominent, acute. Suture not much impressed. Aperture dilated, ovate. Columella much narrowed near the base, so that the view may be extended from the base almost to the interior apex of the shell. Length $\frac{7}{10}$ of an inch nearly, of the spire $\frac{1}{4}$ inch.

Inhabits stagnant waters and miry places. Collection of the Academy.

Animal aquatic, base not so long as the aperture; dusky, with small whitish spots; tentacula broad, pyramidal, compressed; eyes small, black, placed at the inner base of the tentacula.

This species is allied to *L. catascopium* of the American edition of Nicholson's Encyclopedia, but the revolution of the whirls is more oblique, the shell thinner, the aperture much more dilated, and the columella differently formed. For several specimens of this shell I am indebted to Mr. Titian Peale.

Fig. 38.



Limnæa columella.

Var. *a.* Small, black. From Cold Water Creek of the Missouri. This is most probably a distinct species; we obtained but a single specimen of it. (*Say.*)

Limnæa columella, Say, Journ. Acad. Nat. Sc. Phila. I, 14 (1817); II, 167 (1821).—Nich. Enc. 3d ed. (1819); Binney's ed. 60, 56.—Haldeman, Mon. 38, pl. xii (1842).—Gould, Inv. of Mass. 215, f. 144, 216, f. 145 (1841).—DeKay, N. Y. Moll. 72, pl. iv, f. 75 (1843).—Potiez et Michaud, Gal. I, 216, pl. xxii, f. 5, 6.—Anon. Can. Natural. II, 197, fig. (1857).

Limneus columella, Küster in Ch. ed. 2, 44, pl. viii, f. 3–5.

Limnæa chalybea, Gould, Am. Journ. Sc. [I], XXXVIII, 196 (1840); Otia, 180.

Limnæa macrostoma, Say, Journ. Acad. Nat. Sc. II, 170 (1821); Binney's ed. 67.—Gould, Inv. 217, f. 148 (1841).—Anon. Can. Nat. II, 198, fig. (1857).

Limneus macrostomus, Küster in Ch. ed. 2, 43, pl. viii, f. 1, 2.

Limnæa acuminata, Adams, Am. Journ. Sc. [I], XXXIX, 374 (1840).

Limnæa navicula, Valenciennes, Rec. d'Obs. II, 251 (1833).

Limnæa strigosa, Lea, Proc. Am. Phil. Soc. II, 33 (1841); Trans. IX, 12 (1844); Obs. IV, 12.

Limnæa coarctata, Lea, Proc. Am. Phil. Soc. II, 33 (1841); Trans. IX, 11 (1844); Obs. IV, 11.

Limnæa casta, Lea, Proc. Am. Phil. Soc. II, 33 (1841); Trans. IX, 11 (1844); Obs. IV, 11.

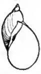
Limnæa columellaris, Adams, Sill. Journ. [I], XXXVI, 392, absq. descr.

Limnæa succiniformis, Adams MS. teste Haldeman.

This species has been found from New England and Lake Superior to Georgia. Its wide range and variable form has caused its being described under several names, which are mentioned in the synonymy and treated at length below. Mr. Say's specimens of *L. columella* are still preserved in the Philadelphia Academy. One is drawn in my figure (Fig. 38). Specimens of his *L. macrostoma* also are there preserved, one being drawn in my figure (Fig. 39). From an examination of it and of the following description, I am led to coincide with Haldeman and DeKay's opinion of its identity with *L. columella*.

Limnæa macrostoma, Say.—Shell suboval; whirls five, body whirl somewhat reticulated; suture not profoundly indented; spire about two-thirds the length of the aperture, acute; aperture much dilated; labrum not thickened on the inner submargin.

Fig. 39.



Limnæa macrostoma.

Inhabits Cayuga Lake. Length ½ inch, and upwards.

Imperfect specimens of this shell were found on the shore of Cayuga Lake, by Mr. A. Jessup, but they are sufficiently entire to exhibit considerable similarity to some varieties of *L. auricularius*, of Europe. It may readily be distinguished from *L. catascopium* by its much more dilated aperture. (*Say.*)

Limnæa acuminata, Adams, seems a synonym of *L. columella*. Haldeman and DeKay so consider it, and Gould refers it to *L. macrostoma*. I have seen no authentic specimen, but give the original description below. It must not be confounded with Brongniart's species of the same name.

Limnæa acuminata, Adams.—Shell fragile, semi-transparent, ovate, with very numerous, revolving, irregular, transverse, parallel striæ; whirls four; spire very short, subacute; last whirl very large; aperture very large, exhibiting the interior of the spire; columella thin, sub-reflected; labium not appressed.

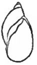
New Bedford.

This differs from *L. columella*, Say, in the much greater proportional size of the last whirl, the breadth of the shell, and the presence of very distinct revolving lines. It resembles *Succinea obliqua*, Say, but the spire is rather less, and no revolving lines are mentioned in the description of that species. The *L. acuminata* has also been found at Horn Pond, in Woburn, Mass., by T. J. Whittemore, Esq. (*Adams.*)

Limnæa chalybea, of Gould, whose description and figure are here copied, is no doubt a form of *L. columella*. It is so stated by him recently (Otia, p. 180), as well as by Haldeman in his Monograph.

Limnæa columella, var. *chalybea*, Gould.—The spire is more pointed, its divergence only about 50°; the aperture is more expanded, and the fold on the inner lip more obvious. It is thin, but not very brittle, ringing like hard-burnt crockery. The last whirl is partially detached from the preceding one, so as to form a thread-like channel at the suture. The enamel rests loosely against the shell, and is wrinkled. The exterior is covered by a bluish-black pigment, not easily removed, and the interior has a steel-blue or black lead color.

Fig. 40.



Limnæa columella, var. *chalybea*.

This shell, which I found two years in succession in a muddy pool in Cambridge, I thought was sufficiently distinct to be regarded as a new species; and I accordingly gave its characters under the name of *Limnæa chalybea*, in Silliman's Journal, XXXIII, 196. But as it has not been found in any other place, I am now disposed to regard it as a strongly marked local variety of *L. columella*. It is very possibly such a shell to which Mr. Say alludes in the Journ. Ac. Nat. Sc. II, 167, as *L. columella*, var. *a.*, small, black, from Cold Water Creek, Missouri. (*Gould.*)

Limnæa navicula, of Valenciennes, whose description follows, is said to be a form of *L. columella*, by Haldeman and Gould, and also by Ferussac (Bull. Zool. p. 35, 1835) and Küster. I have seen no specimen or figure of it.

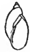
Limnæa navicula, VALENCIENNES.—Shell oval, pointed, subdiaphanous, whirls four, substriate. The last whirl is four times as long as the three others. The aperture is large and gaping, its length equalling two-thirds the shell's length. Shell very thin, slightly transparent. Color grayish-yellow. Length 10 lines.

Hab. Environs of Philadelphia. (*Valenciennes.*)

Finally, an examination of the specimens from which Mr. Lea drew his descriptions of *Limnæa strigosa*, *coarctata*, and *casta*, have convinced me of their identity with *L. columella*. In the case of the second species Haldeman agrees with me, he makes no mention of the others. Mr. Lea's descriptions are copied below, and a figure given of each of the three forms, drawn from his types.

Limnæa strigosa, LEA.—Shell long-oval, somewhat oblique, diaphanous, striate, horn-colored, thin, imperforate; spire short; sutures impressed; whirls five, somewhat convex; aperture ovate.

Fig. 41.



Limnæa strigosa.

Hab. Near Cincinnati, Ohio. T. G. Lea. My cabinet and cabinet of T. G. Lea. Diam. .38, length .75 of an inch.

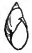
This is a very thin fragile species, somewhat resembling *L. columella*, Say, but may at once be distinguished from that species by its longer spire and less inflated body whirl. It is allied to *L. coarctata*, herein described; differing, however, in being more oblique, and in having the whirls more inflated. The aperture is about three-fourths the length of the shell, and acutely angular above. (*Lea.*)

Limnæa coarctata, Lea, is also referred to *L. macrostoma*, by Küster, *l. c.* Mr. Lea's description here follows, with a drawing of his original specimen.

Limnæa coarctata, LEA.—Shell fusiform, very thin, obsoletely striate, diaphanous, horn-color, imperforate; spire short, pointed; sutures slightly impressed; whirls four, rather flattened; aperture large, ovate.

Hab. Newport, Rhode Island: Col. Totten, United States Army. My cabinet and cabinet of Col. Totten. Diam. .30, length .55 of an inch.

Fig. 42.

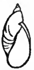


Limnæa coarctata.

This is one of the most delicate and fragile of the genus *Limnæa* which I have seen. It is allied to Mr. Say's *L. columella;* but may at once be distinguished by the compression of the superior part of the body whirl, which causes an acute angle in the superior part of the aperture. Under a rather powerful lens, some of the specimens may be perceived to have very minute revolving striæ. The aperture is two-thirds the length of the shell, and is inflated at the inferior part. The fold of the columella is delicate and incurved. (*Lea.*)

Limnæa casta, LEA.—Shell subfusiform, rather thick, closely striate, yellow, perforate; spire rather elevated, acuminate; sutures impressed; whirls six, convex; aperture large, ovate.

Fig. 43.



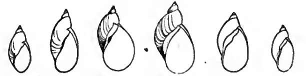
Limnæa casta.

Hab. Poland, Ohio: Dr. Kirtland. My cabinet and cabinets of Dr. Kirtland, and T. G. Lea. Diam. .30, length .58 of an inch.

The columella of this species is remarkably straight, and being reflected, causes the lower part of the aperture to be slightly effuse. The last whirl is wrinkled. The aperture is more than half the length of the shell. It is allied to *L. desidiosa,* Say, but is a smaller species, has the spire more exserted, and a less curved fold. The perforation is very small. Dr. Kirtland kindly sent me many specimens several years since. (*Lea.*)

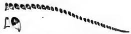
Fig. 44 represents, at one view, the various forms which have been described as distinct species.

Fig. 44.



L. coarctata. *L. casta.* *L. macrostoma.* *L. columella.* *L. chalybea.* *L. strigosa.*

Fig. 45.



Lingual dentition of *L. columella.*

Fig. 45 represents the lingual dentition of the species. There are eighty rows of about seventy teeth each.

Dr. T. R. Ingalls, of Greenwich, N. Y., to whom I am indebted for many specimens of shells and much valuable information, wrote me in 1860 the following curious note regarding *L. columella.* His words are—

"The *L. macrostoma* which I send you requires a note. It comes as near a case of spontaneous generation as anything within my observation. It was found in a little pool about twenty feet in diameter, entirely cut off from streams and fed by a spring. I had for years frequented it for Desmidia, &c., in which it was very rich. One season, and one only, appeared these *Limnææ*, which do not occur elsewhere, as far as I now know, within twenty miles. The pond dried up that season and destroyed the locality."

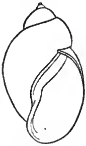
Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8295	3	Ohio.	......	......
8296	7	St. Simon's Island, Ga.	......	......
8297	1	Marietta, O.	W. Holden.	......
8298	9	South Carolina.	W. Stimpson.	......
8299	5	....	W. G. Binney.	Var. *chalybea*, Gld.
8482	2	....	"	Cabinet series.
9139	12	St. Simon's, Ga.	Postell.	......
8979		San Felipe Spr.	Capt. Beale.	......[by Say.
8322	1	....	Ac. N. Sc. Phila.	Marked *L. macrostoma*
9251	9	Massachusetts.	......	*strigosa*, teste Lea.

Subgenus BULIMNEA, Hald.

Shell thick in texture, ovate, inflated; spire short, outer lip not expanded.

Limnæa megasoma, Say.—Large, dilated suboval; spire short, rapidly diminishing, acute; whirls about five, rounded, obtusely wrinkled across; body whirl large, the wrinkles very obvious, suture deeply impressed; aperture subovate, much longer than the spire, within chestnut-brown; columella white. Length more than one and six-tenths of an inch; greatest diameter one inch.

Fig. 46.



Limnæa megasoma.

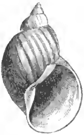
This remarkably large and fine species was found in Bois Blanc Lake, Northwest Territory, by Dr. Bigsby, to whom I am indebted for specimens. The color is brownish, sometimes lineated across the body whirl with dull greenish and pale ochraceous; and the chestnut-brown color of the interior of the shell, combined with its large dimensions, distinguish this species from all others yet discovered in this country. (*Say.*)

Limnæus megasomus, Say, Long's Exp. II, 263, pl. xv, f. 10 (1824); Binney's ed. 129, pl. lxxiv, f. 10.—Küster in Ch. ed. 2, 36, pl. vi, f. 20, 21.

Limnæa megasoma, HALDEMAN, Mon. 13, pl. iii, f. 1-3 (1841).—ADAMS, Shells of Vermont; Thoms. Vt. 153, excl. fig., pamphlet, p. 3 (1842).—DEKAY, N. Y. Moll. 70, pl. iv, f. 70 (1843).

Bulimnea megasoma, CHENU, Man. de Conch. II, 480, f. 3543.

Fig. 47.



Limnæa megasoma.

This is a northern species, ranging from Lake Champlain to Michigan. The shell, by which it is commonly represented in collections, corresponds perfectly with Mr. Say's types in the Philadelphia Academy. His description and figure are copied above (Fig. 46).

Prof. Adams' figure does not represent this species.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8253	1	Burlington, Vt.	......	......
8254	6	Lake Champlain.	W. Stimpson.	......
8487	2	"	"	Cabinet series.
9249	4	Lake Superior.	Dr. J. S. Newberry.	......

SUBGENUS **LIMNOPHYSA**, FITZ.

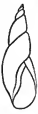
Shell ovate-oblong; spire conic, about as long as the aperture, whirls rounded; outer lip not spreading.

The date of publication of *Limnophysa* is 1833—*Limnæa palustris* being the type. I find this prior to all other names for the section. *Stagnicola*, Leach, was first described in 1840, in Gray's edition of Turton, Leach's work was not then printed, and the edition of Turton bearing date 1831 gives no description, merely referring in the synonymy of several species to Leach's manuscript. *Galba*, Schrank, antedates *Limnophysa*, but is placed in the synonymy by Herrmannsen, no doubt for valid reasons.

Limnæa reflexa, SAY.—Shell fragile, very much elongated, narrow, honey-yellow, tinctured with brownish, translucent, slightly reflected from the middle; volutions six, oblique, wrinkled transversely; spire more than one and a half times the length of the aperture, acute, two or three terminal whirls vitreous, body whirl very much dilated; aperture rather narrow; labrum with a pale margin, and dusky red or blackish sub-margin.

Inhabits Lakes Erie and Superior. Total length $\frac{13}{10}$,[1] of the aperture $\frac{11}{20}$ of an inch.

Fig. 48.



Limnæa reflexa.

This shell is remarkable for its narrow and elongated form, and for the consequent very oblique revolution of the whirls. When viewed in profile it has a slightly reflected appearance. It was kindly sent to me for examination by my friends Messrs. S. B. Collins and D. H. Barnes, of New York, and was found in Lake Superior by Mr. Schoolcraft. I recollect to have seen a specimen two or three years since brought from Lake Erie by James Griffiths. It is proportionally longer than *elongatus*. (*Say.*)

Limneus reflexus, Say, Journ. Acad. Nat. Sc. Phil. II, 167 (1821); Am. Conch. IV, pl. xxxi, f. 2 (1832); Binney's ed. 65, 188, pl. xxxi, f. 2; ed. Chenu, 44, pl. vii, f. 4. —Küster in Ch. ed. 2, 41, pl. vii, f. 11, 12.

Limnæa reflexa, Haldeman, Mon. 26, pl. viii (1842).—DeKay, N. Y. Moll. 71, pl. iv, f. 65, 72 (1843).

Limneus elongatus, Say, Journ. Ac. Nat. Sc. Phil. II, 167 (1821); Long's Exp. II, 263; Binney's ed. 65, 130; ed. Chenu, 43, pl. vii, f. 5.

Limneus umbrosus, Say, Am. Conch. IV, pl. xxxi, f. 2 (1832); Binney's ed. 187, pl. xxxi, f. 2.—Haldeman, Mon. 24, pl. vii (1842).—DeKay, N. Y. Moll. 68, pl. iv, f. 76 (1843).—Küster in Ch. ed. 2, 41, pl. vii, f. 13–16.

Limnæa exilis, Lea, Tr. Am. Phil. Soc. V, 114, pl. xix, f. 82 (1837); Obs. 1, 226.—Küster (*Limnæus*) in Ch. ed. 2, 40, pl. vii, f. 9.

Limnæus palustris, var. *distortus*, Rossmassler (1835), Icon. I, 97, pl. ii, f. 52.

Limnophysa reflexa, Chenu, Man. de Conch. II, 480, f. 3544.

This species has been observed through the northern tier of States, from New York to the Pacific, and in Canada. It extends more to the southward in the western portions of its area, having been found in Kansas and Utah, and in the Columbia and Sacramento Rivers.

I have given above a copy of Mr. Say's description of this species, and a fac-simile (Fig. 48) of the outline of one of his figures. It is a well-known shell, found in great numbers, and common in collections. It is subject to much variation, as shown by the large suite in the collection. Three forms have been described as distinct species, and are treated at length below. It is also readily confounded with *Limnæa fragilis*, so as indeed almost to warrant the conclusion of Forbes & Hanley that "the

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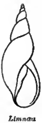
[1] Probably $1\frac{3}{10}$ inch.

reflexa, umbrosa, and *elodes* of Say, which form apparently but one species, are scarcely distinguishable from this variable shell (*palustris*)."

Mr. Say's type of *Limnæa umbrosa* is still preserved in the Philadelphia Academy. My Figure 49 is a fac-simile of the outline of one of his, and a copy of his description here follows. The name *umbrosa* was substituted by Mr. Say for the preoccupied *elongatus.* The shell is considered distinct by Haldeman and DeKay, doubtfully so in Adams' Shells of Vermont.

Limneus elongatus.—Shell horn-color, tinged with reddish-brown; spire elongated, tapering, acute; whirls six or seven, slightly convex, wrinkled across; body whirl, measured at the back, more than half the total length; suture moderately indented; aperture less than half the length of the shell; labium with calcareous deposit. Length one and three-tenths inch.

Fig. 49.



Limnæa umbrosa.

Inhabits, in considerable numbers, the ponds and tranquil waters of the upper Missouri. It is very distinct from *L. catascopium,* by the much greater proportional length of the spire. (*Say* in J. A. N. S.). Rainy Lake and Seine River f Upper Canada.

I am under the necessity of changing the name which I first applied to this shell, that of *elongatus* being pre-occupied by Drâparnaud for a very different species. The fold of the columella is much less profound than that of *L. palustris,* Lin., which it much resembles. (*Say* in Am. Conch.)

Limnæa plebeia, Gould, is quoted doubtfully as a synonym of *L. umbrosus,* by Adams (Middlebury Shells, and Sill. Journ. [1], XL, 268). I refer it, however, to *L. palustris,* as that species is found in Massachusetts, while *umbrosa* is not. Gould mentions *plebeia* by name only in the Catalogue of Massachusetts Shells.

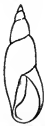
My opinion of the identity of *Limnæa exilis* with *L. reflexa* is based upon an examination of Mr. Lea's original specimen. His description and figure here follow. Haldeman and DeKay place *exilis* in the synonymy of *reflexa.*

Limnæa exilis.—Shell attenuated, very thin, longitudinally striate; whirls seven, plano-convex, columella reflected; aperture ovate-oblong.

Ohio. My cabinet. Diam. .4, length 1.5 inch.

This is, perhaps, the most attenuated *Limnæa* yet observed in this country. It approaches most to the *reflexus,* Say, but is more elongate than that species. The most remarkable character of the *exilis* is, perhaps, the reflection of its labium, which is not laid on the body of the whirl. Where it joins above with the labrum, the angle is quite acute, and is separated from the body whirl. The specimen figured was not taken alive, and the epidermis being destroyed, the description and representation are partially defective. The aperture is about two-fifths the length of the shell. (*Lea.*)

Fig. 50.

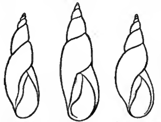


Limnæa exilis

I was at first inclined to place *Limnæa haydeni* in the synonymy of this species. It appears to be distinct after more careful study of the specimens in the collection.

Fig. 51 gives, at one view, the various forms which I have considered synonyms of *L. reflexa*.

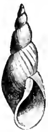
Fig. 51.



L. reflexa. *L. exilis.* *L. umbrosa.*

Limnæus palustris, var. *distortus*, of Rossmassler, is a form of this species, as shown by his figure, of which a fac-simile is here given (Fig. 52).

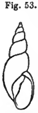
Fig. 52.



L. palustris, var. *distortus*

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8224	8	Milwaukee, Wis.	I. A. Lapham.	......
8225	4	Big Sioux.	......	......
8226	16	Illinois.	......	......
8227	7	....	......	......
8228	8	Goose Island, Mich.	......	......
8229	26	Big Sioux.	......	......
8230	8	Milwaukee Wis.	I. A. Lapham.	......
8231	20	....	......	......
8232	1	St. Clair River.	......	......
8233	3	....	......	......
8234	7	Farwell's Mills, Madison, Wis.	Prof. S. F. Baird.	......
8235	1	Illinois.	......	......
8236	7	Prairie Lke, n. Red Riv.	R. Kennicott.	......
8237	2	Toledo, O.	F. A. Bossard.	......
8238	3	Ohio.	Dr. J. Lewis.	......
8239	11	Goose Island, Mich.	......	......
8240	8	Milwaukee, Wis.	......	......
8241	4	Illinois.	Dr. J. Lewis.	......
8242	13	Grindstone Creek.	......	......
8243	15	Ft. Pierce.	......	......
8491	1	Aztalan, Wis.	Prof. S. F. Baird.	Cabinet series.
8319	6	....	......	......
8521	5	....	......	Cab. series.
3523	3	Pacific Coast.	......	"
8734	2	San Francisco.	Rowell.	......
9066	200+	Milwaukee.	Lewis.	......
9139	20+	....	"	......

Fig. 53.



Limnæa attenuata.

Limnæa attenuata, SAY.—Shell elongate turreted, somewhat translucent; spire slender, attenuated, acute; whirls six or seven, with but a very slight convexity; wrinkles more distinct towards the aperture; body whirl, measured at the back, obviously less than half the total length. Length one inch.

Inhabits Mexico.

This species abounds in ditches and ponds in the vicinity of the capital. It is more nearly related to *L. reflexus*, nob., than to any other known species of North America; but it is only necessary to compare the two in order to perceive a wide difference between them. The present is smaller and proportionally more slender, and the spire is more attennated. (*Say.*)

Limnæa attenuata, SAY, New Harm. Diss. II, 244 (1829); BINNEY'S ed. 148; Descr. 23.—DEKAY, N. Y. Moll. 75 (1843).—HALDEMAN, Mon. 28, pl. ix, f. 1-5 (1842).—KÜSTER (*Limnæus*), CHEMN. ed. 2, 39, pl. vii, f. 8.

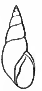
Limnæus subulatus, DUNKER in KÜSTER, CH. ed. 2, 24, pl. iv, f. 24.

Figure 53 is drawn from an authentic specimen of Mr. Say. His description is given above.

In describing the habitat of *Planorbis tenuis*, in Chemnitz, ed. 2, *Limnæus subulatus* is mentioned as common among graves near Mexico. There is also a *L. subulata*, Kickx, mentioned in Dupuy's Mollusques de la France, p. 463. But the species referred to is, I suppose, the one described in Küster's ed. 2 of Chemnitz, Limnæa, p. 24, pl. iv, f. 24. As the last livraison devoted to Limnæa, which has reached this country, contains only a portion of the description of the species, I cannot say what locality is given by Küster for the shell. The figure corresponds with *Limnæa attenuata*, Say. It is copied in Figure 54. A translation of the description here follows:—

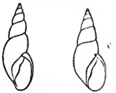
Shell imperforate, subulate-turreted, solid, striated, reddish horn-color; spire elongate, subulate, acuminate; whirls seven, flattened; aperture semioval, yellowish-red, sanguineous at the base; peristome straight, sharp, oblique, with a distinct columellar fold. (*Dunker.*)

Fig. 54.



Limnæa subulata.

Fig. 55.



L. attenuata. *L. subulata.*

Since writing the above the succeeding part of Chemnitz, ed. 2, having arrived, I find the locality to be Mexico, at Zimapan and Lake of Mexico.

Fig. 55 gives, at one view, the two forms which I have considered synonymous.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8294	7	City of Mexico.	......	......
8483	5	"	......	Cabinet series.

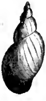
Limnæa sumassi, Baird.—Shell elongate, attenuated, horn-colored, fragile; whirls six, the last twice the size of the remainder; aperture moderate; columella strongly plicate; external surface with microscopic, crowded, very minute decussations. Length of largest 1⅛, breadth ½ inch.

Hab. Sumass Prairie, Fraser River, British Columbia.

This species of *Limnæa* approaches *L. elodes*, Say, but is more elongated, more fragile, and has the columella very strongly plicated. The surface of the shell, when seen under a lens of moderate power, is finely decussately striated. It is of a horny color, and is of an elongated shape. (*Baird.*)

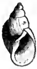
Limnæa sumassi, Baird, Proc. Zool. Soc. London, 1863, p. 68.

Fig. 56.



Limnæa sumassi.

Fig. 57.

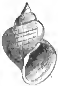


Limnæa sumassi.

This species was collected by the British Boundary Commission. Members of the American Commission also collected the specimens in the Smithsonian collection, which show the species to be extremely variable. I have copied above the original description and two figures from the advance plates of the British Report, kindly furnished by Mr. Carpenter.

A curious specimen, from Ft. Colville (Northwest Boundary Survey), is figured in Fig. 58. It may be referable to this species.

Fig. 58.

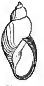


Limnæa sumassi?

Cat. No	No. of Sp.	Locality.	From whom received	Remarks.
9320	30	E. of Ft. Colville, W. T.	N. W. Boundary Surv.	......

Limnæa haydeni.—Shell ovate conic, smooth, thin, light horn-colored, imperforate; spire rather short; whirls five, convex; sutures deeply impressed; aperture ovate; columella strongly plicate.

Fig. 59.



Limnæa haydeni.

Yellowstone and Big Sioux: Dr. Hayden. (*Lea.*)

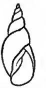
Limnæa haydeni, Lea, Proc. Acad. Nat. Sc. Phila. 1858, 166.

I was at first inclined to place this species in the synonymy of *Limnæa reflexa*. Upon more careful examination of the specimens collected by Dr. Hayden (one of which is here figured), I am satisfied of its being distinct. Its rounded whirls and strongly plicate columella are its chief characteristics.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8230	18	Yellowstone River.	......	Original lot named by [I. Lea.
8231	27	Ruby Valley.	Capt J H. Simpson, Army of Utah.	"Swamps."
8252	6	Mo. of the Yellowstone [River.	......	"In alluvial."
8253	4	Big Sioux.	......	Named by I. Lea.
8523	9	30 m. w of Ft. Kearney.	......	......
8270	28	Bet. Pike L. & Ft. Union.	Gov. J. J. Stevens	......
8485	2	Mo. of Yellowstone.	......	Cabinet series.

Limnæa palustris, Müll.—Shell oblong conic, gradually acuminated, reticulate with transverse lines and longitudinal wrinkles; whirls rather more than six; spire acutely terminated; suture moderately impressed; aperture shorter than the spire; labrum, inner sub-margin, reddish obscure; labium, calcareous deposit rather copious, not appressed at base, but leaving a linear umbilical aperture; body whirl on the back longer than the spire.

Fig. 60.



Limnæa elodes.

Inhabits Canandaigua Lake.

Var. *a.* Whirls simply wrinkled across, the calcareous deposit at base appressed to the surface of the whirl.

This species was found by Mr. A. Jessup; it bears the most striking resemblance to *L. palustris.* The variety was found by the same enterprising mineralogist at Morristown, New Jersey. I have subsequently received specimens from Mr. S. B. Collins, of New York, who procured them in a marsh near the Saratoga Springs. (*Say*, J. A. N. S.) The fold of the columella is much more profound than that of *umbrosus.* (*Say*, Am. Conch.)

Helix palustris, Müller, &c., Rackett, Tr. Linn. Soc. XIII, 42 (1822).

Limnæus elodes, Say, Journ. Ac. Nat. Sc. Phil. II, 169 (1821); Am. Conch. IV, pl. xxxi, f. 3 (1832); Binney's ed. 66, 188, pl. xxxi, f. 3; ed. Chenu, 44, pl. viii, f. 3.—Küster in Ch. ed. 2, 42, pl. vii, f. 17–21.

Limnæa elodes, Gould, Inv. of Mass. 221, f. 146, 147 (1841).—Adams, Shells of Vermont, in Thoms. Hist. 153 (1842).—ANONYMOUS, Can. Nat. II, 199, fig. (1857).

Limnæa fragilis (not of LINNÆUS),[1] HALDEMAN, Mon. 20, pl. vi, xv, f. 1 (1842); 53, pl. xiv, f. 1—DEKAY, N. Y. Moll. 68, pl. iv, f. 68 (1843).

Limnæa palustris, MÜLLER (*Buccinum*), &c.—SHEPPARD (1829), Tr. Lit. Hist. Soc. Quebec, I, 196.

Limnæa nuttalliana, LEA, Pr. A. P. S. II, 33 (1841); Tr. Am. Phil. Soc. IX, 9 (1844) · Obs. II, 9.—KÜSTER (*Limnæus*) in Ch. ed. 2, 38, pl. vii, f. 5.

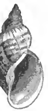
Limnæa plebeia, GOULD? (see below).

Limnæa expansa, HALDEMAN, Mon. 29, pl. ix, f. 6–8 (1842); Suppl. to part 1, p. 3 (1840).—DEKAY, N. Y. Moll. 75, pl. xxxvi, f. 348 (1843).—KÜSTER (*Limnæus*) in Chemn. ed. 2, 39, pl. vii, f. 6, 7.

Ranging from New England, through Pennsylvania and Kansas, to California and Oregon. Very numerous in British America, reaching a high latitude, as shown by specimens from Hudson's Bay and Fort Resolution.

Mr. Say suggests the identity of *L. elodes* with the European *L. palustris*. I have no doubt of it, the species being one of the circumpolar forms common to the three continents. I have given the original description above, and Fig. 60 is a fac-simile of one of Say's. It is a very variable species, sometimes scarcely to be distinguished from *L. reflexa*, as remarked under that species (p. 39). *Limnæa plebeia* is also referred to under *L. reflexa* (p. 40). Dr. James Lewis unites *L. catascopium* and *L. emarginata* to *L. elodes*.

Fig. 61.



Limnæa palustris.

Limnæa nuttalliana appears to me a form of this species. My opinion is based on a careful examination of specimens so labelled by Mr. Lea. The original description here follows, and a drawing of the original specimen. So little does this figure (62) correspond with *L. palustris* that, judging by it alone, I should be inclined to reverse my opinion of the identity of *nuttalliana* with *palustris*. It is one of the points to which attention must be directed. No. 8256 and 8257 were labelled *L. nuttalliana* by Mr. Lea. One of them is here figured (Fig. 61). No. 8318 and 8474 are also this form.

Limnæa nuttalliana.—Shell ovately conical, rather thin, striate, subdiaphanous, pale brown, imperforate; spire rather short; apex red;

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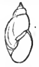
[1] *L. fragilis*, of Linnæus, is synonymous with *L. stagnalis*.

sutures impressed; whirls six, convex; aperture ovate, inflated, banded within.

Fig. 62.



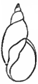
Limnæa nuttalliana.

Oregon. My cabinet and cabinets of Prof. Nuttall and Dr. Jay. Diam. .50, length .95 inch.

A fine, rather robust species, rather resembling *L. elodes*, Say, but shorter and more inflated, and having a larger and more curved fold. The aperture is rather more than one-half the length of the shell, and is retuse at the lower part. Under the lens may be observed very minute revolving striæ. The band within the aperture is removed from the edge of the lip, and is broad and brown. The lip is not reflected. (*Lea.*)

A recent visit to Prof. Haldeman has enabled me to examine the two original specimens, the only ones known, from which were drawn the description of *Limnæa expansa*. Believing them accidental variations only, I add them to the synonymy of *Limnæa elodes*. The Oregon specimen, 8573 of the collection, most nearly resembles this form. A fac-simile of Haldeman's figure and a copy of his description here follow:—

Fig. 63.



Limnæa expansa.

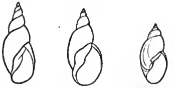
Limnæa expansa.—Shell short, smooth, translucent, and fragile; body whirl inflated; spire as long as the aperture, and rapidly attenuated to an acute apex; whirls five, somewhat flattened; suture shallow, but very distinct, aperture effuse; fold on the columella deep and distinct. Color brownish ochre-yellow.

Found only in Vermont.

I owe the opportunity to describe this new species to Dr. Gould, who gave me specimens, and the information that they are from Vermont. It differs from *L. elodes* in having a polished surface, expanded aperture, obsolete lines of growth, translucency, and a deeper fold upon the columella. It cannot be confounded with any other species. (*Haldeman.*)

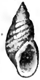
It must constantly be borne in mind that I cannot pretend at this time to speak very positively in regard to the synonymy of the North American Limnæidæ. My conclusions are the best I can arrive at with my present material. It is a point to be decided in future whether *L. nuttalliana* and *L. expansa* are synonyms of *L. palustris*. The forms referred to this species are shown at one view in Fig. 64.

Fig. 64.



L. elodes. *L. expansa.* *L. nuttalliana.*

Fig. 65.



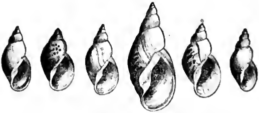
Limnæa palustris.

Fig. 65 will be of interest, as it is copied from Moquin-Tandon's figure of *Limnæa palustris* of France.

Reeve points out the strong resemblance, if not identity, of the European and American shells.

Fig. 66 represents some of the forms of this variable species which are represented in the Smithsonian collection.

Fig. 66.



Variaties of *Limnæa palustris.*

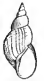
Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8123	8	Monterey, Cal.	......	......
8123	6	Interior Oregon.	Com. Wilkes.	......
8269	6	Yellowstone River.	Col Vaughan.	......
8271	8	Mohawk, N Y. [Wis	Dr J. Lewis.	......
8272	8	Oskosh, L Winnebago,	A. C. Barry.	......
8273	5	Fairhaven. Vt.	Dr. J. Lewis.	......
8274	4	Marietta, O.	W. Holden?	......
8275	2	Lake Winnipeg.	R. Kennicott.	......
8276	13	Scarboro', Me. [wego.	Dr. J. Lewis.	......
8277	1	Four Mile Creek, Os-	......	......
8278	6	Roxbury, Mass.	Dr. J Lewis.	......
8279	6	Nimahaw River, K. T.	Wm. T. Magraw.	......
8280	10	Summer Lake, O.	......	......
8281	16	Near Chimney River.	Wm. T. Magraw.	"Swamps."
8282	9	Mohawk, N Y.	Dr. J. Lewis.	......
8283	14	Grand Rapids, Mich.	...... [land.	......
8284	20	Sing Sing, N. Y.	Rev. R. J W. Buck-	......
8285	14	Mohawk, N Y.	Dr J. Lewis.	......
8286	2	Lake Winnipeg.	R. Kennicott.	......
8287	2	Milwaukee, Wis.	I. A. Lapham.	......
8288	6	Port Huron, Mich.	Prof. S. F. Baird.	"*umbrosa*," I. Lea.
8289	14	Grindstone Creek.	......	......
8290	2	Lake of the Woods.	R. Kennicott.	......
8291	23	Grindstone Creek.	......	......
8464	50	Platte Riv at Ft Kearney, Neb. [get Sound	Capt. J. H Simpson.	[hol. With animal in alco-
8467	28	Chileneyneck Depot, Pu-	A. Campbell.	" "
8477	5	Grand Rapids, Mich.	......	......
8568	2	Pacific Coast.	......	......
8735	12+	San Francisco	Rowell.	In alcohol.
8736	4	Clear Lake. Cal.	Dr. Veatch.	......
8739	2	San Francisco.	Rowell.	......
8953	6	Ft. Simpson, Br. Am.	R. Kennicott.	......
8573	1	Oregon.	......	(*expansa*, Hald?)
8958	..	Ft. Resolution.	R. Kennicott.	......
9072	20+	"	"	......
9073	20+	"	"	......
9136	20+	"	"	......

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9138	10	Mohawk, N. Y.	Dr. Lewis.	……
9176	30+	Vermont.	J. E. Chittenden.	……
9180	10	Lynn, Mass.	Dr. Prescott.	……
8256	16	Apple Creek, lat. 47°.	……	*nuttalliana*, teste Lea
8257	4	Big Sioux.	……	" "
8318	50	Mo. of the Yellowstone.	……	" "
8474	1	Big Sioux.	……	" "
9286	1	Otter Tail Creek, Min.	……	……
9288	15	Upper Mackenzie.	……	……
9291	11	Great Slave Lake.	……	……
9237	5	Wright's L., Cal.	……	*nuttalliana*, teste Lea.
9239	4	Klamath Marsh, O.	Dr. J. S. Newberry.	" "
9246	1	Rhett L., Cal.	……	" "
9241	8	Benicia. [pine.	Dr. J. S Newberry.	……
9289	20	Yukron, mo. of Porcu-	R. Kennicott.	……

Limnæa proxima, Lea.—Shell acutely conic, rather thin, closely and irregularly striated, horn-colored, minutely perforated; spire sub-elevated, sharpened at the apex; sutures deeply impressed; whirls seven, convex; aperture sub-inflated, sub-elliptical, banded within, columella slightly plicate.

Arroya San Antonio, California: Dr. Trask. (*Lea.*)

Fig. 67.



Limnæa proxima.

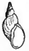
Limnæa proxima, Lea, Proc. Ac. Nat. Sc. Phila. VIII, 80 (1856).

The above is Mr. Lea's description. Fig. 67 is drawn from No. 9204 of the collection, determined by him. The rapid enlargement of the whirls in width appears to be the chief characteristic of this species.

Cat. No	No of Sp.	Locality.	From whom received.	Remarks.
9204	4	San Francisco.	Judge Cooper.	Authentic—one fig'd.
9195	..	California.	"	Named by I. Lea.

Limnæa desidiosa, Say.—Shell oblong sub-conic; whirls five, very convex, the fourth and fifth very small, the second rather large, suture deeply indented; aperture equal to or rather longer than the spire; labium, calcareous deposit copious, not perfectly appressed at base, but leaving a very small umbilical aperture. Inhabits Cayuga Lake. Length 7-10 of an inch.[1]

Fig. 68.



Limnæa desidiosa.

Found by Mr. Augustus Jessup. It is closely allied to *L. elodes*, but the whirls are more convex, one less in number, and the two terminal ones are proportionally smaller; the callus of the labium, also, near its inferior termination, is applied still more closely to the surface of the body whirl. (*Say.*)

Limnæa desidiosa, Say, Journ. A. N. S. II, 169 (1821); Long's Ex. II,

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[1] See remarks under *L. humilis*.

263; Am. Conch. VI, pl. l, f. 5; ed. Binn. 66, pl. iv, f. 3.—Adams, Shells of Vermont, 154 (1842).—DeKay, N. Y. Moll. 73, pl. v, f. 78 (1843).—Küster in Ch. ed. 2, 47, pl. viii, f. 22–26 (*Limnæus*).—Gould, Inv. of Mass. 219, f. 150 (1841).—Haldeman, Mon. p. 31, pl. x; p. 48, pl. xiii, f. 16–18 (1842).—Anony. Can. Nat. II, 198, fig. (1857).

Limnæa acuta, Lea, Tr. Am. Phil. Soc. V, 114, pl. xix, f. 81 (1837); Obs. I, 226.

Limnæa obrussa, Say, J. A. N. Sc. V, 123 (1825); Binney's ed. 113.—DeKay, N. Y. Moll. 75 (1843).

Limnæa philadelphica, Lea, Proc. Am. Phil. Soc. II, 32 (1841); Tr. IX, 8 (1844); Obs. IV, 8.

Limnæa fusiformis, Lea, Pr. Am. Phil. Soc. II, 33 (1841); Tr. IX, 10 (1844); Obs. IV, 10.

From New England to Kansas.

An authentic specimen of *L. desidiosa*, in the Academy's collection, is drawn somewhat larger than nature in Fig. 68.

Mr. Haldeman places *L. obrussa* in the synonymy of *L. desidiosa*. Say's description here follows, and a drawing of an authentic specimen from the Academy at Philadelphia.

Limnæa obrussa.—Shell oblong, rather slender, pale yellowish testaceous; whirls five, slightly rounded; apex acute; suture deeply impressed; aperture not dilated, within pure white; columella with the sinus of the fold very obvious (*Lister*, pl. 114, f. 8 ?). Total length nine-twentieths of an inch; aperture one-fourth; breadth nearly one-fifth.

All the individuals that have occurred were covered with an earthy slime. They inhabit a small rivulet below the fish-ponds at Harrowgate, the seat of my friend Mr. J. Gilliams. (*Say.*)

Fig. 69.

Limnæa obrussa.

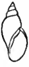
The descriptions of *L. philadelphica*, *fusiformis*, and *acuta* here follow, as well as figures of them drawn from Mr. Lea's original specimens, excepting *L. acuta*, which is copied from his original figure. Haldeman and DeKay both place *L. acuta* in the synonymy of *L. desidiosa*. Specimens labelled *L. philadelphica*, by Mr. Lea, are in the Smithsonian collection from the Yellowstone River. Küster, *l. c.*, places *obrussa*, *acuta*, and *philadelphica* in the synonymy.

Haldeman refers doubtfully *L. casta* to this species. It appears to me, however, rather a synonym of *L. columella*.

The name *L. fusiformis* is preoccupied by Sowerby (Min. Conch. II, 155, pl. clxix, 1818).

Limnæa acuta, LEA.—Shell elevated, turreted, thin, smooth, dark-brown; spire attenuate; whirls six, aperture subovate.

Fig. 70.



Limnæa acuta.

Pond four miles north of Philadelphia. Diam. .3, length .7 inch.

This delicate species, though attenuate, is not so much so as the *exilis*, herein described. Its whirls are more convex and the body whirl larger, the aperture being about one-half the length of the shell. Several specimens were found by me, some years since, in a very small pond near the Falls of Schuylkill. Since then this pond has occasionally dried up, and I have not been able to find others. Although there are other ponds near to this, which other species inhabit, I have never been able to discover the *acuta* in any other spot. (*Lea.*)

Limnæa philadelphica, LEA.—Shell ovately-conical, thin, striated, shining, diaphanous, rather golden, imperforate; spire rather elevated; sutures much impressed. whirls five, convex; aperture narrow-elliptical.

Fig. 71.

Limnæa philadelphica.

Hab. River Schuylkill, neàr Philadelphia. My cabinet and cabinets of P. H. Nicklin, and Dr. Griffith. Diam. .20, length .48 of an inch.

This species is about the size of, and is allied to *plica* and *griffithiana*, herein described, and to *modicella*, Say. It has a more elongated aperture than *griffithiana*, has a smaller fold than *plica*, and is higher in the spire than *modicella*. The aperture is about half the length of the shell. I procured many specimens west of Philadelphia. Dr. Griffith informs me that he found them south of the city. (*Lea.*)

Limnæa fusiformis, LEA.—Shell fusiform, rather thick, closely striate, pale yellow, imperforate; spire rather short; sutures slightly impressed; whirls six, flattened; aperture narrow-elliptical.

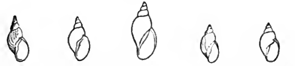
Fig. 72.

Limnæa fusiformis.

Hab. Niagara River, Lewistown, New York: Tobias Wagner. My cabinet, and cabinets of P. H. Nicklin, and Tobias Wagner. Diam. .35, length .60 of an inch.

Among a number of interesting shells collected by T. Wagner, during a long journey in the interior of our country, were several specimens of this species, which has not been, I believe, before noticed. It is found with, and is somewhat allied to, *L. desidiosa*, Say. It differs in being more fusiform, having a larger aperture, and flatter whirls, and in being imperforate. It is about the size of, and resembles, *L. casta*, herein described. It differs in being less elevated in the spire, in the whirls being more flattened, in having a distinct and curved fold, and in being imperforate. The aperture is nearly two-thirds the length of the shell. The last two whirls are disposed to be wrinkled. (*Lea.*)

Fig. 73.



L. desidiosa. *L. philadelphica.* *L. acuta.* *L. obrussa.* *L. fusiformis.*

Fig. 74.

Limnæa truncatula.

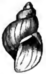
Fig. 73 gives, at one view, the forms which I have referred to the synonymy of this species.

Fig. 74 represents the European representative of *L. desidiosa.* It is copied from Moquin-Tandon's figure of *L. truncatula.*

Cat. No.	No. of Sp.	Locality.	From whom received	Remarks.
8310	4	Minnesota.	I. A. Lapham.	......
8311	11	Grand Rapids, Mich.	Dr. J. Lewis.	......
8312	8	" "	"	......
8313	34	Apple Creek, lat. 47°.	......	......
8314	4	Loup Fork.	......	......
8315	8	....	Dr. J. Lewis.	Calcareous tufa. Fossil.
8316	36	Mohawk, N. Y.	"	......
8317	29	Westbrook, Me.	"	......
8470	25	Mohawk, N. Y.	"	Alcohol.
8476	1	....	W. G. Binney.	......
8526	4	Yellowstone River.	Dr. F. V. Hayden.	Cabinet series.
8951	2	....	......	*philadelphica*, teste Lea.

Limnæa emarginata, Say.—Shell rather thin, translucent; volutions four, very convex; body whirl large; suture deeply impressed, spire somewhat eroded; mouth two-thirds of the length of the shell. Length nearly four-fifths of an inch; of the mouth, half an inch.

Fig. 75.



Limnæa emarginata.

Inhabits lakes of Maine.

This species was discovered by Mr. Aaron Stone. It is a rather larger and considerably wider shell than *L. catascopium*, and the emargination visible on a profile view of the umbilical groove is far more profound. In general obesity it has a resemblance to *L. inflatus*, Brong. It was first sent to me by Mr. Aaron Stone, from the lakes of Maine. Dr. Bigsby presented me with a specimen which he obtained in Upper Canada; and I have recently received several from Mr. Titian Peale, also found in Maine, one of which is double the size of the figure represented in our plate 55, fig. 1. (*Say.*)

Limnæa emarginata, Say, Journ. Acad. Nat. Sc. II, 170 (1821); Long's Ex. II, 63; Amer. Conch. VI, pl. lv, f. 1 (1834).—Binney's ed. 67, 211, pl. lv, f. 1.—Haldeman, Mon. 10, pl. ii (1841).—DeKay, N. Y.

Moll. 73, pl. iv, f. 77 (1843).—Küster in Ch. ed. 2, 44, pl. viii, f. 8–10 (*Limnæus*).

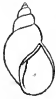
Limneus ontariensis, Muhlfeldt in Küster.

Limnæa serrata, Haldeman, *l. c.*

It is said to have been found from New England to Washington Territory.

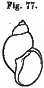
Considerable doubt exists regarding this variable shell, and its identity with *L. catascopium*. It is referred to that species by Stimpson (Shells of N. E. 32) and Gould (Lake Superior). Subsequently it has been referred to *L. elodes*, by Lewis (Boston Proc. V, 122). I have, therefore, given several figures of it in addition to the description of Mr. Say, leaving the question of its specific weight to be decided when more material has been collected. Fig. 75 is a copy of Mr. Say's original figure in the American Conchology. Fig. 77 is copied from one of Haldeman's, drawn from an authentic specimen of Mr. Say. A larger, better developed form, presented to the Smithsonian (No. 9144), by Prof. Haldeman, is drawn in Fig. 78; while a somewhat peculiar form is copied from Haldeman in Fig. 78. He suggests for it the name *L. serrata*, should it prove distinct, and describes it as characterized by elevated lines and undulating peritreme.

Fig. 76.



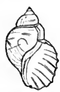
Limnæa emarginata.

Fig. 77.



Limnæa emarginata.

Fig. 78.

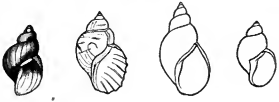


Limnæa emarginata.

Küster, *l. c.*, places in the synonymy of *emarginata* a var. A, *L. ontariensis*, Muhlf. in litt., with an ovate-conic shell, acuminate, whirls convex, the last ovate, aperture semioval.

Fig. 79 gives, at one view, the various forms of *L. emarginata.*

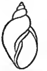
Fig. 79.



Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8302	5	Madison, Wis.	I. A. Lapham.	......
8303	5	Lake Winnipeg.	R. Kennicott.	......
8304	54	....	......	......
8305	9	....	Dr. J. Lewis.	......
8480	3	....	......	Cabinet series.
9128	8	Wisconsin	Dr. J. Lewis.	......
9144	1	....	Prof. Haldeman.	(Fig. 76.)
9161	2	Owasco Lake, N. Y.	Mrs. H. W. Parker.	......
9166	1	Madison, Wis.	I. A. Lapham.	......
9183	1	....	Gen. Totten.	......
9253	4	Lake Superior.	Newberry.	......
9254	11	Otter Tail Creek, Min.	Kennicott.	......

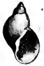
Limnæa catascopium.—Shell thin, horn-color, red, or blackish; whirls four or five, the first large and generally the remainder darker and rapidly decreasing to an acute apex and wrinkled across; aperture large, oval, not three-fourths the length of the shell. Length seven-tenths of an inch; breadth nearly one-half of an inch.

Fig. 80.



Limnæa catascopium.

Fig. 81.



Limnæa catascopium.

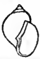
Inhabitant yellowish, sprinkled with small, often confluent, paler dots; tentacula two, broad, pyramidal; eyes black, placed at the base of the tentacula; tail obtuse, rounded or emarginate, not so long as its shell. Pl. 2, fig. 3.

It is with much hesitation that we adopt a new specific name for this shell, having always heretofore considered it the same as the *L. putris* of authors (which has been, perhaps, mistaken for the *Helix limosa* of Linné). As far as we can ascertain, the principal difference appears to be in the mere oblique revolution of the whirls in the European species, and the more abrupt termination of the spire.

Inhabits the Delaware River and many other waters of the United States, in considerable numbers, and may be found plentifully, during the recess of the tide, about the small streams through which the marshy grounds are drained, in company with several other shells. When kept in a vessel of water, like others of its kind, it will proceed not only up the sides of its prison, but also along the surface of the water, the shell downward, with regularity of motion and apparent ease. In this case the reverted base of the animal is concave; and as the surface of the water is compelled to a corresponding concavity, the pressure of the atmospheric column will account for the sustentation of the animal (whose specific gravity is much greater than that of the water) in this singular position. It occasionally crawls to the margin of the water to inhale a supply of air; with this object the foramen is protruded to the surface, and opened with an audible snapping sound, similar to that produced by the resilience of the nib of a pen.

Its European analogue is the *L. peregrum*, L., from which it may be distinguished by a deeper fold of the columella.

Fig. 82.



L. catascopium.

and a more acute curvature of the inferior portion of the aperture. Pl. 55, fig. 2. (*Say.*)

Limnæa catascopium, Say, Nich. Ency. pl. 11, f. 3 (1817, 1818, 1819); Am. Conch. VI, pl. lv, f. 2 (1834); ed. Binney, 45, 211, pl. lxx, f. 3; pl. lv, f. 2.—Haldeman, Mon. 6, pl. 1 (1841).—Gould, Inv. of Mass. 223 (1841).—DeKay, N. Y. Moll. 67, pl. vi, f. 80 (1843).—Mrs. Gray, Fig. Moll. An. cccx, f. 7.—Küster in Ch. ed. 2 (*Limnæus*), 46, pl. viii, f. 15–21.—Potiez et Michaud, Gal. des Moll. I, 216, pl. xxi, f. 3–4.—Anon. Can. Nat. II, 201, fig. (1857).

Limnæa cornea, Valenciennes, Humb. & Bonpl. Rec. 1833, II, 251.

Limnæa pinguis, Say, J. A. N. Sc. V, 123 (1825); ed. Binney, 114 (not of Dohrn, Pr. Zool. Soc. 1858, 134).

Limnæa virginiana, Lamarck, An. s. Vert. VI, 160.—Deshayes in Lam. 8, 411; ed. 2, III, 416; Enc. Meth. Vers, II, 362 (1830).—Delessert, Rec. des Coq. xxx, 4 (1831).

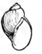
Limnæa sericata, Ziegler, teste Haldeman.

Helix catascopius, Eaton, Zool. Text-Book, 195 (1826).

This species is exceedingly abundant in the Delaware River. No. 9207 of the collection shows some of its variable forms. It has also been noticed from New England to Lewis River, and abounds in high latitudes in the British Possessions.

Limnæa pinguis, Say, is still represented by authentic specimens in the Academy's collection, one being drawn in my Figure 83. Say's description is given below. Mr. Haldeman agrees with me, and DeKay doubtfully places it in the synonymy of *L. catascopium*.

Fig. 83.



Limnæa pinguis.

Limnæa pinguis, Say.—Shell oval, rather ventricose, pale dirty-yellowish; whirls nearly four, rapidly diminishing to the apex, which is dull fulvous; suture moderate, spire rather more than half the length of the aperture; aperture large; labrum with the inner margin a little thickened. Total length eleven-twentieth, aperture rather more than seven-twentieth, breadth seven-twentieth inch.

Proportionally shorter and much more dilated than other species of the country, with the exception of *L. macrostomus*, from which it is readily distinguished. It inhabits the Delaware and Schuylkill Rivers near Philadelphia, in company with *L. catascopium*. (*Say.*)

Limnæa cornea is referred to *L. catascopium* by Haldeman and Gould, and also by Ferussac (Bull. Zool. 1835, 33). I have seen no authentic specimen, but give a translation of the original description below.

Limnæa cornea, Valenciennes (*l. c.*).—Shell ovate-conic, thin, subpellucid; whirls five, lightly striate; aperture not expanded.

This little *Limnæa* is but slightly ventricose; the aperture is hardly as large as in the following species (*L. navicula*). The height of the last whirl is double that of the four other whirls taken together. Whirls with fine striæ parallel to the right lip. Aperture oval, its vertical diameter equalling two-thirds of that of the last whirl; breadth only one-half the length.

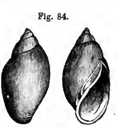
Color yellowish horn. Length 9 lines. Environs of Philadelphia. (*Valenciennes.*)

I have seen no authentic specimen of *L. virginiana*, and should hardly refer it to this species. It is, however, doubtfully placed in the synonymy by Haldeman. The original description of Lamarck and figures of Delessert here follow. It is referred to *L. columella* in Beek's Index. Dr. Gould tells me that specimens of *L. columella*, in the Leyden Museum, are labelled *L. virginiana.*

Limnæa virginiana, LAMARCK.—Shell ovate-ventricose, very thin, diaphanous, longitudinally wrinkled, grayish; whirls five, the last longer than the spire; labrum turned backwards.

Hab. Fresh-waters of Virginia. Its thinness renders it very fragile. 15 lines long. (*Lamarck.*)

Fig. 84.



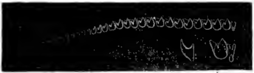
Limnæa virginiana.

In addition to the synonymy already given above, Haldeman and DeKay refer to this species *L. decollata* (*q. v.*). Lewis (Bost. Proc. VI, 122) places *L. catascopium* and *emarginata* in the synonymy of *L. elodes.* Küster, *l. c.*, quotes, as synonyms of *L. catascopium*, the following: *L. pinguis*, *L. cornea*, *L. virginiana.*

Fig. 80 and 82 are fac-similes of those of Mr. Say. Fig. 81 is from a specimen taken in the Delaware River.

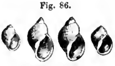
The lingual dentition of *Limnæa catascopium* is figured in Fig. 85. There are 105 rows of teeth, 34 laterals in each row.

Fig. 85.



Lingual dentition of *Limnæa catascopium.*

Fig. 86.



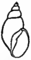
Limnæa catascopium?

Fig. 86 represents specimens in the collection, some of which bear a resemblance to forms of *L. catascopium*, though the more globose among them would hardly be referred to that species. So variable are the species of this genus that I have hesitated in proposing a specific name for them. They were collected by Dr. Hayden, at Grindstone Creek (No. 8304 of collection).

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8308	7	Delaware River.	......	......
8309	31	Mohawk, N. Y.	......	......
8478	3	Delaware River.	Dr. J. Lewis.	Cabinet series.
9133	50	Erie Canal.	"	......
9065	100	Moose Factory.	Drexler.	......
8975	..	Lake Utah.	Capt. Burton.	......
9134	20+	....	Dr. J. Lewis.	......
9207	20	Delaware River.	Binney.	......
9329	2	Halifax.	W. Stimpson.	......

Limnæa caperata, SAY.—Shell suboval, a little oblong, obscurely yellowish-horn color; spire half the length of the mouth; apex acute; whirls slightly wrinkled across, and with very numerous, equal, subequidistant, elevated, minute, revolving lines; suture not very deeply impressed; aperture rather dilated; fold of the labium not profound.

Fig. 87.



Limnæa caperata.

Inhabits Indiana.

The remarkable character of this species consists in the numerous revolving lines with which the surface is marked, but these are so minute as to require the aid of a magnifier to bring them to view. It was found on land subject to inundation, near New Harmony, by Dr. Troost. (*Say.*)

Limnæus caperatus, SAY, New Harmony Diss. II, 230 (1829); Descr. 23; BINNEY'S ed. 148; KÜSTER in Ch. ed. 2, 47, pl. viii, f. 27–30.

Limnæa caperata, HALDEMAN, Mon. 34, pl. xi, f. 1—9 (1842).—ADAMS, Shells of Vermont, 154 (1842).—DEKAY, N. Y. Moll. 69, pl. iv, f. 66, 69; pl. v, f. 79 (1843).—MRS. GRAY, Fig. Moll. An. pl. cccx, f. 8.

Limnæa umbilicata, ADAMS, Am. Journ. Sc. [1], XXXIX, 374 (1840); Boston Journ. Nat. Hist. III, 325, pl. iii, f. 14 (1840).—GOULD, Invert. of Mass. 218, f. 149 (1841).

This species is found in the British Possessions as far north as Hudson's Bay, and through the northern tier of States from New England to Lake Superior. The form known as *L. umbilicata* is found along the northern tier of States to Michigan, has been quoted from Louisiana, catalogued by Adams from Jamaica, and placed by Poey in the synonymy of *L. cubensis*, Pfr.

No. 8429 of the collection has Prof. Adams's label "*L. umbilicata.*" I follow Haldeman and Küster in considering it a synonym of *L. caperata*, giving below a copy of Adams's figure and description.

Limnæa umbilicata.—Shell rather strong, brown, ovate, with slight striæ of growth, and more slight, numerous, irregular, revolving, impressed lines; whirls five, convex; suture deeply impressed; spire two-fifths of the length of the shell, conic, subacute at the apex, angle of its opposite sides about 65°; body whirl inflated, subglobular; aperture ovate, its plane, also the line of its length at angles of about 15° with the axis of the shell, three-fifths as long as the shell; labrum thin, inner margin dark-brown, inner submargin thickened with a light pink deposit; columella strong, reflected and spread over an umbilicus, which is rather large, but not profound, and formed chiefly by the reflection of the columella; fold of the latter inconspicuous. Length .28, breadth .17 inch. Cabinets of the Boston Soc. Nat. Hist., of Middlebury College, of Mr. Shiverick, and my own. New Bedford.

Fig. 88.

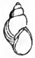
Limnæa umbilicata.

For this species I am indebted to Mr. Shiverick, who obtained numerous specimens. It resembles *L. caperatus*, Say, but in Say's species the aperture is but one-half the length, the revolving lines are raised, more distinct and numerous, the umbilicus is rather less, and there is one more whirl. (*Adams.*)

Cal. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8291	11	Mohawk, N. Y.	Dr. J. Lewis.	......
8292	1	Goose Island, Mich.	......	......
8293	18	New York.	Dr. J. Lewis.	......
8454	6	....	......	Cabinet series.
9071	2	Hudson's Bay.	Drexler.	......
8247	6	Milwaukee, Wis.	I. A. Lapham.	......
8248	7	Westfield, Mass.	Dr. J. Lewis.	......[Adams.
8249	3	....	W. G. Binney.	*umbilicata*, teste

Limnæa vahlii, Beck & Möll.—Shell ovate-oblong; spire convex-conic, rather obtuse; whirls about six; suture somewhat deep; aperture longer than a half the length of the shell. Length 9‴. (*Möller.*)

Fig. 89.



Limnæa vahlii.

Limnæa vahlii, Möller (1842), Ind. Moll. Gr. 4.—Küster in Ch. ed. 2, 27, pl. v, f. 8–10.
Limnophysa vahlii, Beck, teste Möller.

From a specimen received from Möller, and deposited in the collection, Fig. 89 was drawn. The species is given by name only in Rink's Greenland, p. 76, by Mörch, with the following varieties :—

Var. α. *nitens* (*L. pingellii*, Bk. & Möll).
Var. β. *leucostoma* (*L. grönlandica*, Jay's Cat.)
Var. γ. *malleata*.
Var. δ. *parva*; peristome often unattached, with an elevated parietal line. (*Mörch.*)

Of these synonyms, *Limnæa grönlandica* is unknown to me. I find no description of it, though it is mentioned by name in Beck's Index Moll. Gr. p. 4, and by Mörch, Moll. Grön. p. 70.

Fig. 90 is drawn from an authentic specimen of *L. pingelii*, in the collection of the Smithsonian Institution. I have given Möller's description below, with a separate synonymy and museum register, in case it should have erroneously been placed in the synonymy of *L. vahlii*.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8816	2	Greenland.	......	Cabinet series. Fig. 89.

Limnæa pingelii, Beck.—Shell ovate-elongate; spire conic, rather acute; whirls five; suture deep; aperture shorter than half the length of the shell; narrowly rimate. Length 6, 5‴. (*Möller.*)

Fig. 90.

Limnæa pingelii.

Limnæa pingelii, Beck, Möller, Ind. Moll. Gr. 5 (1842).—Küster, Ch. ed. 2, 27, pl. v, f. 11, 12.
Limnophysa pingelii, Beck, teste Möller.
Limnæa vahlii, Mörch, pars, Rink's Gr. 76.

Greenland (see last species).

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8817	1	Greenland.	......	Cabinet series. Fig. 90.

Limnæa wormskioldii, Mörch.—Intermediate species. Shell umbilicate, very solid; spire elongate, acute; suture deep; aperture semilunar; peristome sometimes disconnected. (*Mörch.*)

Limnæa wormskioldii, Mörch, Moll. Grönl. 76 (Rink's Greenl.).

I can find no fuller description or any further information regarding this species.

Limnæa holbollii, Beck & Möll. (Index Moll. Gr. 5 (1842).—Mörch, Moll. Gr. 76.

I can find no description of this species. Fig. 91 is drawn from a specimen in the collection received from Möller.

Since writing the above I have met with a figure of the species in Küster, Chemn. ed. 2, 28, pl. v, f. 13–15, and the following description :—

Fig. 91.

Limnæa holbollii.

Shell broadly rimate, ovate conic, rather thin, shining, horn-colored, striate ; spire conical, truncated, suture rather profound, whirls convex ; aperture ovate, shorter than one-half of the shell's length ; peristome straight, its columellar termination white, with an obsolete fold. Height 5–6‴ ; breadth 2½–3‴. (*Küster.*)

Cat No.	No. of Sp.	Locality.	From whom received.	Remarks.
8815	3	Greenland.	......	Cabinet series. Fig. 91.

Limnæa adelinæ, Tryon.—Shell thin, semi-transparent, body whirl large, wide, convex ; spire small, consisting of five convex volutions, attenuating rapidly to an acute apex, sutures impressed ; inner lip thin, reflected, but not covering the umbilical fissure, which is narrow ; columella twisted ; color light horn, polished within the aperture, outer lip tinged with red within. Length 14, greater diameter 8½ ; of aperture, length 9, breadth 5 mill.

San Francisco, California : Rev. J. Rowell. My cabinet and cabinet of Mr. Rowell.

This shell is nearly allied to *L. catascopium*, Say, and perhaps more nearly to *L. intermedia*, Mich., of Europe. From the former it may be distinguished by being more fragile, more transverse, with a smaller, more rapidly attenuating spire, but principally by the presence of an umbilical fissure, which in *catascopium* is entirely concealed by the appression of the labium. In this and other respects it is very near to *L. intermedia*, which, however, has a shorter spire, of fewer volutions. I name this species after my sister, Miss Adeline S. Tryon, who has evinced much interest in conchological pursuits. (*Tryon.*)

Fig. 92.

Limnæa adelinæ.

Limnæa adelinæ, Tryon, Proc. Phila. A. N. S. 1863, 149, pl. i, f. 12.

The original description and figure are copied above.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9335	4	Piscados, Cal.	G. W. Tryon.	......

Limnæa vitrea, Haldeman.—Shell ovate, extremely thin and delicate; surface smooth and polished; lines of growth very fine; aperture ample: the labium presents a well marked fold, and is not appressed anteriorly; spire short.

Fig. 93.

Limnæa vitrea.

Ohio? Missouri?

Foreign analogue, *L. tenuis*, Bronn.

This species presents us with a shell which is probably thinner in texture than that of any other we have. For the specimens figured I am indebted to Mr. G. B. Emerson, President of the Boston Society of Natural History. (*Haldeman.*)

Limnæa vitrea, Haldeman, Mon. pt. 4, cover, p. 3; p. 47, pl. xiii, f. 14, 15 (1842).—DeKay, N. Y. Moll. 75 (1843).

Fig. 93 is copied from Haldeman, whose description is given above.

Limnæa traskii, Tryon.—Shell elongated, the spire drawn out and apex acute; whirls six, convex, almost shouldered, sutures deeply impressed; aperture small, oval, labrum well rounded, labium slightly rounded, not appressed below, not covering the umbilicus, which, though small, is very distinct. Color light horn or cinereous. Length 16, diam. 8; of aperture, length 7, diam. 5 mili.

Fig. 94.

Limnæa traskii.

Mountain Lake, California: Rev. J. Rowell. My cabinet, and cabinet of Mr. Rowell.

At first I was disposed to regard this shell as a variety of *L. proxima*, Lea, but a comparison with the type specimens of that species shows the following differences: the volutions are not so oblique, and are more rounded, the aperture is also more rounded, and the shell is umbilicated. Named in honor of Dr. J. B. Trask, one of the pioneers of Californian Conchology. (*Tryon.*)

Limnæa traskii, Tryon, Proc. Phila. A. N. S. 1863, 149, pl. 1, f. 13.

The above are copies of the original description and figure of this species.

Limnæa pallida, Adams.—Shell moderately elongate, ovate-fusiform, very pale horn color, semi-transparent, not very thin, with fine, irregular striæ of growth, without revolving striæ; whirls about five and a half, moderately convex; suture well impressed; spire four-ninths of the length of the shell, acutely conic, its opposite sides containing an angle of about 45°, subacute at tip; body whirl not much enlarged, somewhat produced below; aperture five-ninths of the length of the shell, subovate-acute above, angle of its plane with the axis of the shell about 15°, of its length with the axis about 10°; labrum not thickened internally;

Fig. 95.

Limnæa pallida.

fold of the columella distinct, but not very large; umbilicus rather small. Length .48 inch; breadth .22 inch. Cabinets of the Boston Soc. N. H.; of Middlebury College; of Dr. A. A. Gould, of Boston; of J. G. Anthony, of Cincinnati; and my own.

Habitat and station. This species was found in considerable numbers at Storeham, Vt., on the shore of Lake Champlain, clinging to rocks and stones.

This species most resembles *L. acuta*, Lea, of which, however, I have not seen a specimen. That shell, in a very brief description, is said to be delicate, smooth, and dark-brown, while this is rather strong, striate, and of a very pale horn color, in living specimens, like the weathered shells of kindred species. The figure represents the columella of the *acuta* as intruding upon the aperture, which is not the case with this shell. (*Adams.*)

Limnæa pallida, Adams, Am. Journ. Sc. [1], XXXIX, 374 (1840); Bost. Journ. Nat. Hist. III, 324, pl. iii, f. 13 (1840); Shells of Vermont, 153 (1842).—Haldeman, Mon. 45, pl. xiii, f. 11-13 (1842).—DeKay, N. Y. Moll. 69, pl. iv, f. 67 (1843).

Found from New England to Michigan, and apparently in California. Mr. Lea quotes it from San Antonio Arroya.

Fig. 95 is a fac-simile of one of Adams's figures, accompanying his description, which is also copied above.

It must not be confounded with *L. pallida*, Guer.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8244	3	....	......	......
8490	1	....	Phila. Acad. Nat. Sc.	Cabinet series.
8733	11	San Francisco.	Rowell.	......

Limnæa bulimoides, Lea.—Shell ovately-conical, rather thin; smooth, shining, diaphanous, brownish-yellow, slightly perforate; spire rather short; sutures small, whirls five, slightly convex, aperture ovate.

Oregon: Prof. Nuttall. My cabinet, and cabinet of Mr. Nuttall. Diam. .22, length .38 inch.

Among the shells taken by Prof. Nuttall, in his journey over the Rocky Mountains, was this small species, the aperture of which is formed very much like a *Bulimus*. The deposit of the columella is wide, and nearly covers the perforation, which consequently is very small. The aperture is nearly half the length of the shell, and the fold obsolete. Several of the specimens, although the substance of the shell is thin, have the apex eroded, some of the superior whirls being entirely gone. I have not observed this to be the case in other *Limnææ*. (*Lea.*)

Fig. 96.

Limnæa bulimoides.

Limnæa bulimoides, Lea, Proc. Am. Phil. Soc. II, 33 (1841); Trans. IX, 9 (1844); Obs. IV, 9.—Haldeman, Mon. 44, pl. xiii, f. 9, 10 (1842). —DeKay, N. Y. Moll. 75 (1843).

To Mr. Lea's original description I have added Fig. 96, copied from an authentic specimen. Among the specimens in the collection Nos. 8525 and 8870 were determined by Mr. Lea.

Found by Dr. Hayden, in his explorations of the Yellowstone, and at several points in the Pacific States.

I have seen specimens strongly resembling *Bulimulus pilula*.

Cat No.	No. of Sp.	Locality.	From whom received.	Remarks.
8525	6	Grindstone Creek	......	Named by I. Lea. [Cab. ser.
8870	6	Columbia River, near Fort Vancouver.	......	......
8730	10	San Francisco.	Rowell.	......

Limnæa solida, Lea.—Shell acutely conical, solid, smooth, horn color; spire rather turreted; whirls five; columella reflected; aperture subovate.

Fig. 97.

Limnæa solida.

Hab. Wahlamat, near its junction with the Columbia River: Prof. Nuttall. My cabinet, and cabinet of Prof. Nuttall. Diam. 5-20th, length 8-20th of an inch.

A single specimen of this species was among the shells given to me by Prof. Nuttall. It differs from any species which I know, in being more solid. In this specimen the interior is brownish. (*Lea.*)

Limnæa solida, Lea, Trans. Am. Phil. Soc. VI, 94, pl. xxiii, f. 91 (1839); Obs. II, 94.—Haldeman, Mon. 36, pl. xi, f. 10–13 (1842).—DeKay, N. Y. Moll. 75 (1843).

Limnæa apicina, Lea, Trans. Am. Phil. Soc. VI, 102, pl. xxiii, f. 94 (1839); Obs. II, 102.—Küster in Ch. ed. 2 (*Limnæus*), 48, pl. viii, f. 31–33.

Dr. Gould quotes *L. apicina* from Oregon.

Haldeman places *L. apicina* in the synonymy of *L. solida*, as does also DeKay and Küster. Copies of the descriptions and figures of both species are given.

Limnæa apicina, Lea.—Shell obtusely conical, rather solid, smooth, horn colored; spire rather short; whirls four; columella reflected, aperture subovate.

Fig. 98.

Limnæa apicina.

Hab. Wahlamat, near its junction with the Columbia River: Prof. Nuttall. My cabinet, and cabinet of Prof. Nuttall. Diam. .3, length .4 of an inch.

This small species is rather more globose than usual. It is distinguished by a dark apex. Within the outer lip there is a dark-brown band. (*Lea.*)

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8523	11	30 m. w. of Ft. Kearney.	......	......

Limnæa humilis, SAY.—Shell ovate-conic, thin, translucent, with slight wrinkles; volutions nearly six, convex, terminal one very minute; suture well indented; aperture about equal in length to the spire; labium with an obvious plate of calcareous deposit; a distinct and rather open umbilical aperture; color pale reddish-white or yellowish-white. Total length seven-twentieths inch.

Inhabits South Carolina.

Of a dozen specimens sent me by Mr. Elliott, none exceeded the limit here assigned to the species. It differs much from any other species I have seen; a variety of it, sometimes quite black, was found by Dr. McEuen, at Oswego, on the Susquehanna. It may be useful here to remark that, in consequence of a typographical error in the first part of the second volume of this work, the species above described may be confounded with the *desidiosus*. The length of that shell is erroneously stated to be seven-twentieths of an inch, instead of seven-tenths, its true length. (*Say*)

Fig. 99.

Limnæa humilis.

Limnæa humilis, SAY, Journ. A. N. S. II, 378 (1822); BINNEY's ed. 110.—HALDEMAN, Mon. 41, pl. xlii, f. 1–8 (1842).—DEKAY, N. Y. Moll. 71, pl. iv, f. 71 (1843).

Limnæus modicella, SAY, J. A. N. Sc. V, 122 (1825); BINNEY's ed. 113.—GOULD, Inv. of Mass. 218, f. 151 (1841).

Limnæa linsleyi, DEKAY, N. Y. Moll. 72, pl. iv, f. 74 (1843).—LINSLEY, Shells of Conn. Am. Journ. Sc. [1], XLVIII, 282 (1845).

Limnæa parva, LEA, Proc. Am. Phil. Soc. II, 33 (1841); Tr. IX, 11 (1844); Obs. IV, 11.

Limnæa plica, LEA, Proc. Am. Phil. Soc. II, 33 (1841); Tr. IX, 10; Obs. IX, 10 (1844).

Limnæa griffithiana, LEA, *l. c.*, II, 33 (1841); IX, 8 (1844); Obs. IV, 8.

Limnæa planulata, LEA, *l. c.*, II, 33 (1841); IX, 9 (1844); Obs. IV, 9.

Limnæa rustica, LEA, *l. c.*, II, 33 (1841); IX, 10 (1844); Obs. IV, 10.

Limnæa exigua, LEA, *l. c.*, II, 33 (1841); IX, 9 (1844); Obs. IX, 10.

Limnæa curta, LEA, *l. c.*, II, 33 (1841); IX, 11 (1844); Obs. IV, 11.

Ranges from Maine to Georgia, and from Kansas to Lake Superior.

Fig. 99 is drawn from an authentic specimen in the collection of the Philadelphia Academy.

Haldeman places *L. modicella* in the synonymy of *L. humilis*. I have given below the original description and a figure (Fig. 100) of an authentic specimen, also from the Philadelphia Academy

Limnæa parva is placed doubtfully, by Haldeman, in the synonymy of *L. humilis*. I have so placed it after an examination of the description and the type which is drawn in Fig. 102.

Mr. Lea also quotes *L. exigua* from San Antonio Arroya. No. 8523 of the collection, from the Yellowstone River, is labelled *L. curta*, by Mr. Lea. These and the other species of the same author, given in the synonymy, are all drawn below, the figures being in each case from the original specimen. The original descriptions, also, are given.

Of *L. linsleyi*, also, I give the original description and a facsimile of the original figure.

Limnæa modicella, SAY.—Shell blackish, not elongated; whirls rather more than four, convex; suture deeply impressed; apex acute; aperture very regular, the labium and labrum being sub-equally curved; the fold of the columella rather slight. Total length seven-twentieths of an inch, breadth one-fifth; length of the aperture one-fifth.

Fig. 100.

Limnæa modicella.

Smaller than any of the species I have hitherto described. It was found, by Dr. M'Euen, at Oswego, on the Susquehanna River, near the State of New York. (*Say.*)

Limnæa curta.—Shell subturreted, rather thin, shining, subdiaphanous, yellow, perforate; spire elevated; sutures impressed; whirls six, convex; aperture small, elliptical.

Fig. 101.

Limnæa curta.

Hab. Cincinnati, Ohio: T. G. Lea. Poland, Ohio: Dr. Kirtland. My cabinet, and cabinets of T. G. Lea and Dr. Kirtland. Diam. .18, length .32 of an inch.

A very small, erect species, resembling, in the form of the aperture, a *Bulimus*, the fold being scarcely perceptible. In its general outline it resembles a *Paludina* more than most *Limnææ*. In these characters it is allied to *L. bulimoides* herein described. The aperture is rather more than one-third the length of the shell, and the last whirl is wrinkled. The columella is thickened, and reflected over the perforation. (*Lea.*)

Limnæa parva.—Shell subturreted, thin, smooth, diaphanous, horn color, subperforate; spire elevated; sutures impressed; whirls five, convex; aperture elliptical.

Fig. 102.

Limnæa parva.

Hab. Cincinnati, Ohio: T. G. Lea. My cabinet, and cabinet of T. G. Lea. Diam. .12, length .22 of an inch.

This is the smallest species which has come under my notice. In general form it resembles *L. curta*, herein described. It is rather less inflated, has a longer aperture, and is diminutive.

The perforation, too, is smaller, and the columella more curved. The two specimens before me have the superior whirls black from the deposit of the oxide of iron. The aperture is about half the length of the shell. (*Lea.*)

Limnæa plica, Lea.—Shell turreted, rather thin, yellow, striate, imperforate; spire rather elevated; sutures impressed; whirls five, convex; aperture small elliptical.

Hab. Tennessee: Dr. Troost. My cabinet, and cabinet of Dr. Troost. Diam. .18, length .38 of an inch.

A small species with a large incurved fold. It resembles *L. exigua*, herein described, in size, but in the form of the columella it is entirely different. The aperture is about half the length of the shell.

Fig. 103.

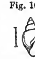
Limnæa plica.

Limnæa planulata, Lea.—Shell ovately conical, thin, smooth, subdiaphanous, brown, perforate; spire rather short; sutures impressed; whirls five, convex; aperture small, ovate.

Hab. White Sulphur Springs, Virginia: P. H. Nicklin. My cabinet, and cabinet of P. H. Nicklin. Diam. .15, length .35 of an inch.

Several specimens of this small species are before me, one of them considerably larger than the others and possessing one more whirl. The whirls are inflated, but flattened in the middle. This gives a roundness to their superior part. The perforation is small and the fold scarcely observable. The aperture is less than half the length of the shell, and contracted. (*Lea.*)

Fig. 104.



Limnæa planulata.

Limnæa exigua, Lea.—Shell subfusiform, thin, striated, diaphanous, pale yellow, perforate; spire rather short; sutures impressed; whirls five, rather convex; aperture elliptical.

Hab. Tennessee: Dr. Troost. My cabinet, and cabinet of Dr. Troost. Diam. .15, length .35 of an inch.

This is a small species about the size of *L. plica*, herein described, and in outline resembling it. It differs, however, altogether, in the columella, which is nearly, and the fold scarcely observable. The aperture is about one-half the length of the shell, and contracted at the lower part. (*Lea.*)

Fig. 105.

Limnæa exigua.

Limnæa rustica, Lea.[1]—Shell subfusiform, thin, imperforate; spire rather elevated; sutures impressed; whirls five, rather convex; aperture narrow elliptical.

Hab. Poland, Ohio: Dr. Kirtland. My cabinet, and cabinet of Dr. Kirtland. Diam .15, length .35 of an inch.

A single specimen only of this was received with some other

Fig. 106.

Limnæa rustica.

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[1] H. & A. Adams (II, 253) catalogue a *Limnæa rustica*, Andrz, but whether it has priority of publication or not, I do not know.

species. It is a small and rather slender species, with a regular tapering spire and an aperture about half the length of the shell. The whole shell is covered over with a red coating of the oxide of iron, giving it a rough aspect. (*Lea.*)

Limnæa griffithiana, Lea.—Shell ovately conical, thin, substriate, shining, somewhat diaphanous, yellowish horn-color, perforate; spire rather short; sutures impressed; whirls five, convex; aperture elliptical.

Hab. Charlotte Lake, Columbia County, New York: Dr. Griffith. My cabinet, and cabinets of Dr. Griffith and Philadelphia Museum. Diam. .20, length .30 of an inch.

Rather a small species, differing from most in the form of the mouth, which is nearly a perfect ellipse. In a perfect specimen before me, the aperture within the margin of the lip is thickened by a raised line. The aperture is not quite one-half the length of the shell. I name it after R. E. Griffith, M. D., who seems to be the only person who has observed it. (*Lea.*)

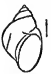
Fig. 107.

Limnæa griffithiana.

Limnæa linsleyi, DeKay.—Shell ovate, subventricose; whirls five, rounded, and rapidly attenuated to the apex; suture deep; aperture oblong-oval, longer than the spire. Pillar-lip with a broad calcareous deposit, the lower portion reverted, and partially covering the umbilicus. Lip thin, forming a shoulder at its junction with the preceding whirl. Body-whirl towards the margin of the outer lip, flattened as in *megasoma*, and impressed with deep incremental striæ which are evident from within. Color: Epidermis chestnut, often obscured by a blackish subvillous pigment. Length, 0.25; aperture, 0.15.

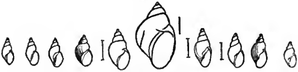
This shell has affinities of form with *catascopium*, and more especially with the variety which is designated by Say as *L. pinguis.* That variety is, however, represented as having a moderate suture, and the whirls nearly four. I have ventured to impose upon it a new name, expressive of my obligations to the Rev. Mr. Linsley, of Stratford, who furnished me with the specimens from his neighborhood. (*DeKay.*)

Fig. 108.



Limnæa linsleyi.

Fig. 109.



Forms of *L. humilis.*

Fig. 109 gives, at one view, the various forms which I have referred to *L. humilis.*

Cat No	No. of Sp.	Locality.	From whom received.	Remarks.
8258	15	Northern Georgia.	A. Gerhardt	......
8259	23	Big Sioux.	Dr. F. V. Hayden?	...... [Gerh.
8260	8	Northern Georgia.	A. Gerhardt	"*L. sylvestris*," A.
8261	7	Otsego County, N. Y.	Dr. J. Lewis.	......
8262	11	....	......	......
8263	18	Yellowstone River?	......	......
8264	19	N. Georgia.	A. Gerhardt.	......
8265	64	Yellowstone River.	......	......
8266	6	Milwaukee, Wis.	I. A. Lapham.	...... [Gerh.
8267	14	N. Georgia.	A. Gerhardt.	"*L. riparius*," A.
8268	20	....	W. G. Binney.	......
8486	4	Georgia.	A. Gerhardt.	...... [I. Lea.
8523	1	Yellowstone River.	Dr. F. V. Hayden.	Named "*curta*" by

Limnæa ferruginea, HALDEMAN.—Shell ovate-conic, thin in texture and diaphanous, with four convex whirls, distinct suture, and well-marked columellar fold; aperture oval, about as long as the spire; labium appressed, ferruginous.

Oregon: Mr. Nuttall.

Closely allied to *L. humilis*, but may be distinguished by the want of an umbilic, and the well-defined fold on the columella. (*Haldeman.*)

Fig. 110.

Limnæa ferruginea.

Limnæa ferruginea, HALDEMAN, Mon. pt. III, p. 3 of cover (1841), 49, pl. xiii, f. 19, 20 (1842).—DEKAY, N. Y. Moll. 75 (1843).

The above description and figure are copied from Haldeman.

SUBGENUS **LEPTOLIMNEA**, SWAINSON.

Shell nearly cylindrical; spire thick, lengthened; aperture small.

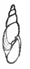
H. & A. Adams use *Omphiscola*, Rafinesque, as the name of this section. I protest against the use of the name in any other sense than proposed by Rafinesque (see spurious species of *Limnæa*). Beck's section *Omphiscola* corresponds with *Leptolimnea*, and he would be quoted as authority for it had he used a new name.

Limnæa kirtlandiana, LEA.—Shell turreted, thin, irregularly striate, pale horn-color, imperforate; spire attenuate; sutures impressed; whirls six, slightly convex; aperture narrow-elliptical.

Habitat. Poland, Ohio: Dr. Kirtland. My cabinet, and cabinets of Dr. Kirtland and T. G. Lea. Diam. .26, length .70 of an inch.

Many years since, Dr. Kirtland sent me several specimens of this shell. I am not aware of its having yet been de-

Fig. 111.



Limnæa kirtlandiana.

scribed. It may have been mistaken for *L. acuta*, being about the size and having the aspect of that shell. It may be distinguished from it by having a longer and narrower body whirl, and a shorter and narrower aperture. The fold on the columella is smaller and the outer lip less curved. It is a smaller species than the *reflexa*, Say, has one whirl less, and the mouth is longer. In other characters it resembles it, if the reflected lip be excepted. The aperture is rather less than half the length of the shell. Most of the specimens have an obscure brown line within the margin of the outer lip. The body whirl is disposed to be flattened, and is irregularly wrinkled. Under the lens, the fine striæ which usually are found in the *Limnææ*, may be observed beautifully displayed over the whole shell. The superior portion of all the specimens sent, have more or less deposit of the oxide of iron, which gives them the appearance of having two colors. (*Lea.*)

Limnæa kirtlandiana, LEA, Proc. Am. Phil. Soc. II, 33 (1841); Trans. IX, 12; Obs. IV, 12 (1844).

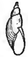
No. 8527 of the collection, so labelled by Mr. Lea, are from Apple Creek, lat. 47°.

Mr. Lea's description and a figure drawn from his type are given above.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8527	1	Apple Creek, lat. 47°.	Dr F. V. Hayden.	Cab series. Named by I. Lea.

Limnæa lanceata, GOULD.—Shell moderate, thin, diaphanous, horn-colored, attenuated, delicately reticulated with incremental and revolving striæ; whirls six, flattened, quite oblique, the last equalling three-fourths of the shell's length; aperture narrow, almost equalling one-half the shell's length, acute posteriorly; columella fold conspicuous, acute, scarcely spiral; labrum with a submarginal chestnut band. Length ⅗, breadth ¼ inch.

Fig. 112.



Limnæa lanceata.

North shore of Lake Superior, "Pie Lake," where it was collected by Prof. Agassiz.

Next to *L. gracilis* this is the most delicate species we have. It may be compared with *L. attenuata* and *L. reflexa*, from both of which it differs in the flatness of its whirls, in its aperture, which is proportionally much longer and narrower, and in being only about half their size. It is much like large specimens of *Physa hypnorum* reversed. (*Gould.*)

Limnæa lanceata, GOULD, Proc. Boston Soc. Nat. Hist. III, 64 (1848); in AGASSIZ' Lake Superior, 244, pl. vii, f. 8–9; Otia, 206.

In addition to Gould's original description, I am able to add

Fig. 112, drawn from his type, which he sent me for this purpose. No. 9126 of the collection was presented by Prof. Agassiz, from among the original lot collected by him.

Cat. No.	No. of Sp.	Locality.	From whom received	Remarks.
9126	1	Lake Superior.	Prof. Agassiz.	Type.

SUBGENUS **ACELLA**, HALD.

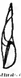
Shell very slender, spire attenuated, whirls flattened, oblique; aperture produced, expanded, without fold.

Limnæa gracilis, JAY.—Shell very slender, with from four to six flat and very obliquely revolving whirls; suture distinct; lines of accretion fine; labium unattached, without fold; aperture ovate, spread out, and rounded at both ends. Color nearly white.

This is the most slender species of *Limnæa* known, and was discovered by Prof. Emmons in Lake Champlain.

Prof. Adams mentions a specimen in his cabinet one inch in length, and in the convexity of the penult whirl only .15 inch diameter. The last whirl is scarcely broader, except across the lips, both of which are expanded. Although nearly seven times longer than the average breadth, it has only four and a half whirls. (*Haldeman.*)

Fig. 113.



Limnæa gracilis.

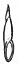
Limnæa gracilis, JAY, Cat. 3d ed. 112, pl. i, f. 10, 11 (1839).—ADAMS, Shells of Vermont, Thom. Vt. 153, pamphlet, 3 (1842).—DEKAY, N. Y. Moll. 70, pl. iv, f. 73 (1843).—HALDEMAN, Mon. 50, pl. xiii, f. 21 (1842).

Acella gracilis, CHENU, Man. de Conch. II, 480, f. 3545.

The species has also been quoted from Wisconsin, Ohio, and Michigan. Fig. 113 was photographed from nature on to the wood. The following are Jay's description and figure:—

Essex County, N. Y. I am indebted to Prof. Benedict, of Burlington, Vt., for two specimens of this very slender and fragile *Limnæa*. (*Jay.*)

Fig. 114.



Limnæa gracilis.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8524	10	Schuyler's Lake, N. Y.	Dr. J. Lewis.	Cabinet series.
9127	1	New York	"	......
9068	20+	Otsego County, N. Y.	"	......

SPURIOUS SPECIES OF LIMNÆA.

Limnæa decisa, SAY, Nich. Ency. ed. 1 and 2, pl. ii, f. 6 = *Melantho decisa.*
Limnæa heterostropha, SAY, Nich. Ency. pl. i, f. 6 = *Physa heterostropha.*
Limnæa subcarinata, SAY, Nich. Ency. pl. 1, f. 7 = *Lioplax subcarinata.*
Limnæa virginica, SAY, Nich. Ency. pl. ii, f. 4 = *Melania virginica.*
Limnæa vivipara, SAY, Nich. Ency. pl. i, f. 5 = *Vivipara contectoides.*

I find *Limnæa nigrescens*, *gracilis*, and *reticulata* mentioned as new species by DEKAY in N. Y. Zoological Report of Dec. 20, 1839, p. 32. I know of no other mention or any description of the species.

Limnæa heterostropha is mentioned by name only in Adams' List of Fresh Pond Shells. *Physa heterostropha* being also mentioned, I do not know to what species he may refer. (Silliman's Journ. [1], XXXVI, 392.)

Limnæa ovata, LAM. is mentioned in the Catalogue of Shells of Massachusetts, 1838, p. 37. I do not know what species is referred to under this name.

WOODWARD (Man. 399) quotes *Limnæa truncatula* from the Canadian region, referring it doubtfully to *L. decollata.* (See remarks under *L. desidiosa.*)

Among the writings of C. S. RAFINESQUE occur some descriptions of *Limnæidæ* which I repeat here. I translate them from the Podrome de 70 nouveaux genres d'animaux, &c., in the Journal de Physique, de Chemie, et d'Histoire Naturelle, LXXXVIII, June, 1819. However little claim to accuracy the writings on American conchology of this author may possess, it seems to me we are bound to acknowledge and examine carefully all his published descriptions, rather than entirely ignore their existence, as some would do.

> *Omphiscola*, l. c. p. 423.—Differs from *Lymnula* (*Lymnea*, Auct.) by its inferior lip being detached from the columella and divided from it by a long umbilicus. Family of *Limnidæ.* Many lacustrine and fluviatile species.
>
> *Espiphylla*, l. c.—Differing from *Lymnula* (*Lymnea*, Auct.) by its rounded aperture and its claviform tentacles carrying the eyes at their end. Family *Lymnidæ.* Only one lacustrine species, *E. nympheola.*
>
> *Cyclemis*, l. c. p. 424.—Differs from *Lymnula* by its rounded shell of two or three slightly oblique whirls. Aperture large, almost round. Animal like that of *Espiphylla?* Two lacustrine species, *C. minutissima* and *C. olivacea.*
>
> *Lomastoma*, l. c.—Shell acute, pyramidal. Aperture oblong, base obtuse, summit sharp, entirely surrounded by a detached, marginal, acute lip, which is decurrent and inflected at the junction of the summit; no operculum or umbilicus. Animal unknown. Singular genus of the family *Lymnidæ?* One only known species, *L. terebrina.* Shell subulate, smooth,

four whirls, pale red; aperture one-third the shell's length, breadth one-third of its length. Very rare. In brooks.

Limnæa lubricoides, Lea, of Nebraska Territory, is catalogued without description by Mr. Lea in Warren's Report on Nebraska. (Ex. Doc. H. of Rep. 2d Sess. 35th Cong. 1858–9, Vol. II, part 3, p. 724.) No description of any such species has been published.

Limnæa corrugata is quoted, without description, from Georgia, by Sowerby in Tankerville Coll. p. 42 (1825), *Helix corrugata*, Budoin MS. being given as synonym.

Limnæa petitii, Beck, Newfoundland. No description. Index, p. 113.

Omphiscola pugio, Beck (Index) is mentioned from Mexico, without description.

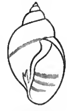
Limnæa rugosa, Valenciennes, appears an immature specimen of some *Bulimulus*. I give below a copy of the original description, and an outline of the original figure. According to Ferussac (Bull. Zool. 1835, p. 33), it is his *Cochlogena dombeiana*. See also Pfeiffer, Symb. III, 63.

Limnæa rugosa, Valenciennes.—Shell ovate-conic, thin, white, with an obsolete yellowish band; whirls with very numerous furrow-like wrinkles.

This species has six whirls, of which the last is twice as long as the others; ventricose; surface wrinkled by numerous longitudinal ridges, which are not exactly parallel to the edge of the right lip; they are still apparent on the fifth whirl, but on the fourth are mere fine striæ, while the three first whirls have neither striæ or folds.

Aperture an elongated ellipse, slightly narrowed towards the base, its transverse diameter being but one-half the longitudinal; right lip thin and sharp. Within the traces of the external ridges of the last whirl are visible.

Fig. 115.



Limnæa rugosa.

Columella thin, edge rounded, thrown back on the last whirl so as to form a very small umbilicus. Color white, with transverse reddish band, parallel to the suture, on the middle of the last whirl. Length 14 lines.

Hab. Mexico (Bonpland). (*Valenciennes.*)

Limnæa rugosa, Valenciennes, in Humb. & Bonp. Rec. d'Obs. II, 250, pl. lvi, f. 5 (1833).—Haldeman, Mon. 15, pl. iii, f. 4, 5 (1841).—DeKay, N. Y. Moll. 75 (1843).

Limnæus rugosus, Küster, in Ch. ed. 2, 38, pl. viii, f. 3, 4.

Limnæa conoidea, Say, and *L. lineata*, Say, are mentioned by name by H. & A. Adams, Gen. Rec. Moll. II, 253. I know of no descriptions of such species by that author.

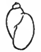
Limnæa plicata, LEA, mentioned by name only in the Canadian Geological Report for 1858, by Mr. D'URBAN, is, I suppose, *L. plica*, Lea.

Limnæa fossaria is quoted without description from Canada, &c., by J. DE C. SOWERBY in Richardson's Fauna Boreali-Americana, III, 316 (1836).

Limnæa merostoma, RAV. Cat. p. 11, err. typ. for *macrostoma*.

Limnæa platystoma, HALDEMAN.—Shell thin, transparent, and globose; composed of four whirls, the last of which constitutes nearly the entire shell; aperture ¾ the entire length, very wide posteriorly; labium and labrum nearly parallel. Length ½ inch.

Fig. 116.



Limnæa platystoma.

Hab. Vermont. (*Haldeman.*)

Limnæa platystoma, HALDEMAN, Suppl. to Mon. pt. I, p. 2 (1840).

The above is Haldeman's description, and Fig. 116 is from his type. No. 9131 was presented by him. Thus we have all the information extant regarding the species. As Prof. Haldeman's original label refers the shells to Maine or Marseilles, it must be considered a doubtful inhabitant of America.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9131	1	Maine or Marseilles.	Haldeman.	Fig. 116. Type.

Limnæa alternata, SAY, mentioned by name only by BELL (Can. Geol. Rep. for 1858) is unknown to me, as is also *L. opacina*, BELL.

FOSSIL SPECIES OF LIMNÆA.

I am indebted to the kindness of Dr. Meek for the following list of fossil species:—

Limnæa vetusta, MAAK, Proc. Acad. Nat. Sc. 1860, 314.
Limnæa similis, MEEK, Proc. Acad. Nat. Sc. 1860, 314.
Limnæa diaphana, EVANS & SHUMARD, Proc. Acad. Nat. Sc. VIII, 1860, 165.
Limnæa nebrascensis, EVANS & SH. Proc. Acad. Nat. Sc. VIII, 1860, 165.
Limnæa tenuicostatus, MARK & HAYDEN, Proc. Acad. Nat. Sc. 1860, 117.
Limnæa meekiana, EVANS & SHUMARD, MSS.
Limnæa? multistriata, MEER & HAYDEN, Proc. Acad. Nat. Sc. 1860, 431.

Limnæa (*Limnophysa*) *galbana*, SAY.—Shell subovate; whirls nearly five, very convex; suture very deeply impressed; apex acute; body whirl a little flattened in the middle; aperture not dilated; columella with the sinus of the fold very obvious. Length three-tenths of an inch; aperture rather more than half the whole length.

Fig. 117.

Limnæa galbana.

For this shell I am indebted to Mr. Nuttall, who obtained it in a marl pit near Franklin, New Jersey. He considers it fossil, as well as numerous specimens of *Planorbis campanulatus*, *Valvata tricarinata*, and *Physa heterostropha*, found with it. I have never seen a recent specimen, but the present corresponds with some individuals belonging to the Philadelphia Museum, also said to be fossil. (*Say*.)

Limnæus galbanus, SAY, Jour. Acad. Nat. Sc. Phila. V, 123 (1825): BINNEY's ed. 114.

Limnæa galbana, HALDEMAN, Mon. 51, pl. xlii, f. 22, 23.

Mr. Say's type, still preserved in the Philadelphia Academy is drawn in Fig. 117. I have heard of no other locality than that given by Say.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8340	10	New York.	Dr. Lewis.	......

——— ?

——? berendti, PFEIFFER. Fig. 118 is drawn from a curious shell lately received by the Smithsonian Institution from Mirador, sixty miles west from Vera Cruz, under the name of *Physella berendti*, Pfr. It belongs to a new genus, but *Physella* is preoccupied by Haldeman.

Fig. 118.

——?
berendti.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9357	2	Mirador, Mex.	Dr. Berendt.	One Fig.

POMPHOLYX, LEA.

Tentacles short, stout, rounded. Mantle[1] — ? Foot short, bluntly rounded posteriorly.

Shell dextral, depressed-globose, translucent, horn-colored; spire short, obtuse, last whirl very wide, ventricose; aperture very large, wide, subcircular, expanded; inner lip thickened, outer lip acute.

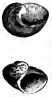
Jaw — ?

Lingual membrane — ?

---

[1] I have seen only specimens in alcohol. From these it appears that the only known species cannot be a *Limnæa*, as its tentacles are not flattened and triangular. The eyes are at the place usual in *Limnæidæ*.

Fig. 119.



Pompholyx effusa, enlarged.

Pompholyx effusa, Lea.—Shell small, striate, roundly gibbous, rather thin, effuse, reddish horn-colored; whirls five, flattened above, convex below; aperture subrotund, dilated, within white, spotted.

Sacramento River: Dr. Trask. (*Lea.*)

Pompholyx effusa, Lea, Proc. Phila. Acad. VIII, 80 (1856); Jour. de Conch. 2d series, II, 208 (trans.), 1857.—H. & A. Adams, Gen. Rec. Moll. pl. cxxxviii, f. 11.

Fig. 119 is drawn from Mr. Lea's type.

Cat. No	No. of Sp	Locality.	From whom received.	Remarks.
9242	5	Pitt River.	Dr. Newberry.	Type.

CARINIFEX.

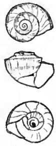
Tentacles —? Mantle —? Foot —?

Shell dextral, spiral, inflated, angular, horn-colored; spire terraced, whirls numerous, angular, visible above, last whirl very large, broad above, very rapidly attenuated below; umbilicus funnel-shaped; aperture triangular, broad above, narrow below; inner lip slightly thickened; outer lip thin, acute, angular above, flexuose.

Jaw —? Lingual membrane —?

The general appearance of the shells for which the generic name of *Carinifex* is proposed would place them among the *Limnæidæ*. Nothing is known of the generic characteristics. The base of the shell resembles somewhat *Taphius*, but that subgenus has the upper surface of *Planorbis*, flattened, spire sunken, whirls rounded.

Fig. 120.



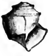
Carinifex newberryi.

Carinifex newberryi, Lea.—Shell light horn-colored, depressed, turreted, very minutely striated, above and below acutely carinated, broadly and deeply umbilicated, whirls five, flat; aperture large, light horn-colored, subtriangular.

Klamath Lake and Canoe Creek, California: Dr. J. S. Newberry. (*Lea.*)

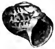
Planorbis newberryi, Lea, Proc. Phila. Acad. Nat. Sc. 1858, 41.

Fig. 121.



C. newberryi.

Fig. 122.



C. newberryi.

Fig. 120 is drawn from the original specimen in Mr. Lea's cabinet. A more elevated form is figured also.

It has also been found in Clear Lake, California.

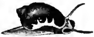
Another form of this species is figured in Fig. 122. It is less carinated, much more rounded in the whirls, but apparently identical with *C. newberryi*. It is from Pitt River, California.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8726	..	Clear Lake, Cal.	Dr. Veatch.	Named by Lea.
8727	..	"	"	Cab. ser. Named by Lea.
9254	21	Klamath Lake.	Dr. Newberry.	Type.
9256	15	Canoe Creek, Cal.	"	......
9341	6	Pitt River, Cal.	Dr. Cooper.	Type.
9342	1	"	"	" Figured.

PHYSA, Draparnaud.

Tentacles slender, setaceous. Mantle covering part of the shell, the margin fringed or digitate. Foot long, acuminate behind.

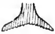
Fig. 123.



Physa heterostropha.

Shell sinistral, oblong, thin and polished; spire acute; aperture oval, rounded anteriorly, not dilated; inner lip spread over the last whirl, simple in front; outer lip acute.

Fig. 124.



Jaw of *Physa*.

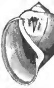
Jaw single, superior, chevron-shaped.

Lingual membrane —?

This genus is widely distributed over the globe, and is numerous in species in this country, where it extends more southerly than *Limnæa*. In its habits it is more active than the other *Limnæidæ*, both in walking and in gliding, shell downwards, on the surface of the water.

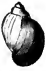
It will be seen in the generic descriptions of *Physa* and *Bulinus* that the former name is restricted to those species having a digitated mantle, and the latter applied only to those whose mantle is simple. As Adanson founded his genus on a species having a simple mantle, his name is retained for the last section, leaving Draparnaud's[1] later name for the first section. Thus any confusion of synonymy is avoided.

Fig. 125.



Physa lordi.

Fig. 126.



Physa lordi.

Physa lordi, BAIRD.—Shell thin, quite large, corneous, tumid, gibbous, aperture large; outer lip acute, marked with an external white or brownish line; external surface very minutely decussated; whirls six, the first two minute, tinged with black, the last swollen, four times the size of the others. Length from $\frac{3}{4}$ to 1 inch, breadth from $\frac{1}{2}$ to $\frac{3}{4}$.

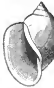
Lake Osoyoos, British Columbia. (*Brit. Mus.*)

This species is one of the largest of the genus, and is much swollen and gibbous. The outer lip is generally marked with a streak of brown edged with white, which mark is left in those specimens which are of older growth, leaving a white callous-looking line of growth edged with brown, nearly in the centre of the last whirl, which is very large—being about four times the size of all the others put together. The two upper whirls, which are very small, are of a black color.' The surface of the shell is finely decussately striated.

The *Physa heterostropha* of Say abounds in the Sumas Prairie, on the Fraser River; but its place seems to be taken on the higher ground towards the Rocky Mountains by the *Ph. lordi* (*Baird.*)

Physa lordi, BAIRD, Proc. Zool. Soc. London, 1863, p. 68.

Fig. 127.



Physa lordi.

I have given above the original description of this species and Figs. 125 and 126, copied from advance proofs of the plates illustrating the British Boundary Commission Report. Fig. 127 is drawn from a specimen collected by the American Commission of the same Survey.

This is the largest North American species of *Physa* yet described.

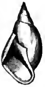
Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9310	2	E. of Ft. Colville, W. T.	N. W. Boundary Surv.	Fig. 127.

---

[1] Draparnaud did not make this distinction in the genus, but his first species has a fringed mantle.

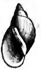
Physa gabbi, Tryon.—Shell large, thin, closely striated with the lines of growth; body whirl inflated, its upper half flattened, so that the labrum appears angulated in the middle; spire moderate, apex acute, whirls six, convex, with distinct sutures. Color light corneous, very much polished within; lip margined with red. Length 25, diam. 13; of aperture 15, breadth 3 mill.

Fig. 128.



Physa gabbi.

Fig. 129.



Physa gabbi.

Mountain Lake, Cal.: Rev. T. Rowell. Santa Ana River, Los Angelos County, Cal.: Wm. Gabb. My cabinet, and cabinets of Mr. Rowell and Mr. Gabb.

Several specimens of this fine large species were communicated to me by my friend Mr. Wm. Gabb, after whom I take great pleasure in naming it. It is a much larger, thinner species than *Ph. heterostropha*, Say, and is at once distinguished by the peculiar flattening of the superior portion of the body whirl. The same character will also distinguish it from *Ph. bullata*, Gld., in which species the aperture, moreover, is proportionally longer. (*Tryon.*)

Physa gabbi, Tryon, Proc. Phila. Acad. Nat. Sc. 1863, 149, pl. i. f. 14.

This is a very well-marked species. Fig. 128 is copied from the original figure of Mr. Tryon, whose description is given above. Another figure also is given.

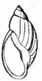
Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9336	4	California.	G. W. Tryon.	......

Physa gyrina, Say.—Shell heterostrophe, oblong; whirls five or six, gradually acuminating to an acute apex; suture slightly impressed; aperture more than one-half, but less than two-thirds the length of the shell; labrum a little thickened on the inner margin. Length rather less than one inch.

Inhabits waters of the Missouri.

Of this species I found two specimens at Bowyer Creek, near Council Bluff. It differs from *P. heterostropha* in magnitude, in having a more elongated spire, and less deeply impressed suture. (*Say.*)

Fig. 130.



Physa gyrina.

Physa gyrina, Say, J. A. N. S. II, 171 (1821).—Binney's ed. 67.—Haldeman, Mon. 32, pl. iii, f. 1-6 (1843).—? DeKay, N. Y. Moll. 79, pl. v, f. 87 (1843).—Chemnitz, ed. 2, 20, pl. v, f. 7-10.—Adams, Shells of Vermont, 154 (1842).

Physa elliptica, Lea, Tr. Am. Phil. Soc. V, 115, pl. xix, 83 (1837); Obs.

I, 227.—DeKay, N. Y. Moll. 77, excl. syn. *cylindrica*, err. typ. (1843). —Chemnitz, ed. 2, 22, pl. iii, f. 20–22.

Physa hildrethiana, Lea, Pr. Am. Phil. Soc. II, 32 (1841); Trans. IX, 7 (1844); Obs. IV, 7.

It is mentioned in catalogues, &c., as inhabiting a wide area, the extreme points being Vermont, San Francisco, Michigan, Georgia, Louisiana and Utah.

Mr. Say's type of *Physa gyrina* is still preserved in the Academy at Philadelphia. It is drawn in Fig. 130.

No. 8108 of the collection was labelled *Ph. elliptica*, by Mr. Lea. It does not appear to me distinct from this species, in the synonymy of which it is also placed by Haldeman. A copy of Lea's original description and figure here follow. The name has also been used by Parreyss.

Physa elliptica, Lea.—Shell sinister elliptical, very thin, pellucid, chestnut colored, shining; spire rather short; whirls four; outer lip margined; aperture narrow. Diam. .2, length .5 inch.

Fig. 131.

Physa elliptica.

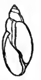
Hab. ———: T. G. Lea. My cabinet.

This species is less inflated and more of a chestnut color than any I am acquainted with. Its color is almost reddish, and the light-colored margin of the outer lip is remarkable. The aperture is rather contracted, and the whole shell somewhat elongate. (*Lea.*)

Physa hildrethiana, Lea, also appears to me a synonym of *Physa gyrina*. Mr. Lea's description and a figure of his original specimen here follow.

Physa hildrethiana, Lea.—Shell elliptical, somewhat compressed, long. somewhat pellucid; spire obtusely elevated; whirls five: lip margined; aperture long, compressed.

Fig. 132.



Physa hildrethiana.

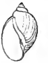
Hab. A lake in Illinois: Dr. Hildreth. Diam. .40, length .75 of an inch.

This species is among the largest, and is perhaps the most remarkable *Physa* yet observed in this country. The aperture is little more than half the length of the shell. The apex is very obtuse, and the whole shell is somewhat cylindrical. A single specimen was brought by Mr. Nicklin from Dr. Hildreth, and I name it after him, as he seems first to have observed it. (*Lea.*)

Cat. No.	No. of Sp	Locality.	From whom received.	Remarks.
8073	12	South Carolina	W. Stimpson.	......
8074	33	Grindstone Creek.	......	......
8075	36	Utah Territory.	......	......
8076	11	....	......	......
8077	33	Farwell's Mills, Madi-	S. F. Baird.	......
8078	50	St Louis. [son, Wis.	......	......
8079	8	Ann Arbor, Mich.	W. O. Binney.	......
8080	12	St. Clair River.	......	......
8081	3	Michigan.	......	......
8082	3	Racine, Wis.	S F. Baird.	......
8084	2	Milwaukee, Wis.	I. A. Lapham.	......
8085	5	Utah.	Capt. J. H. Simpson.	......
8086	10	....	......	Cabinet series.
8520	2	....	W. G. Binney	......
8729	1	San Francisco.	Rowell.	Cab. ser. W. Coast.
9094	50	Grand Rapids, Mich.	Dr. Lewis.	*P. hildrethiana*, teste
9167	1	Michigan.	W. G. Binney.	......]Lewis.
8108	64	Grand Rapids, Mich.	Dr. J. Lewis.	*P. elliptica*, Lea.
8109	1	Indiana.	W. G. Binney.	Named by I. Lea.
8516	7	Michigan.	Dr. J. Lewis.	Named by Dr. R. E.
9209	14	Uniontown, Ala.	Dr. Showalter.	Cab. ser. [Griffith.

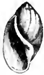
Physa ampullacea, Gould.—Shell large, ovate-ventricose, thin, fragile, shining, horn-colored; spire elevated, acute; whirls six, last one inflated; suture decidedly impressed; aperture broadly ovate, five-sixths the length of the shell; labrum thin, submargined with red; columella quite flexuous, covered with callus. Length 1, breadth $\frac{13}{20}$ to $\frac{11}{20}$ inch.

Fig. 133.



Physa ampullacea.

Fig. 134.



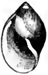
Physa ampullacea.

Found in Oregon by Dr. J. G. Cooper.

Distinguished by its large size, inflated form, and delicate structure; sometimes the form is somewhat cylindrical. It accords most nearly with Haldeman's plate iii, f. 9, which was given him as *P. sayii*, Tappan. It is much more delicate, and less polished than *P. heterostropha*, Say, and the aperture is less elongated. (*Gould.*)

Physa bullata, Gould, Proc. Bost. Soc. Nat. Hist. V, 128 (1855); Otia, 216 (not of Pot. et Mich.).
Physa ampullacea, Gould in litt.

Fig. 135.



Physa ampullacea.

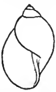
Found also in Lake Oyosa, Washington Territory, by Dr. Cooper, one of whose specimens is figured above. (Fig. 133.)

The name proposed by Dr. Gould for this species being preoccupied by Potiez and Michaud, I, 223, 1838, he suggests that adopted above.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8374	4	....	......	......
8722	5	....	......	......
8170	2	Oregon.	Dr. J. G. Cooper.	Original ex'm named
9264	2	Rhett Lake, Cal.	Dr. Newberry.	...... [by Gould.
9267	11	Upper Klamath Lake.	"	......

Physa sayii, Tappan.—Shell sinistral, ovate, color brownish-yellow or chestnut; whirls five; the first large, the others small, terminating in an acute, dark brown apex; aperture large, four-fifths of the length of the shell; translucent. Length 1, breadth $\frac{7}{10}$ inch.

Fig. 136.



Physa sayi.

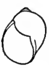
I first found this shell, May, 1837, in a small lake called Lake Pipin, which is separated about fifty rods from the Cuyahoga River, in Franklin Township, Portage County, Ohio, the same locality where was found the *Anodonta pepiniana*, Lea. All the shells of this species hitherto found were dead, although much time was spent in examining for live ones, in May, 1837, and June, 1838. A few only were found, and are in the cabinets of Mrs. Say, Dr. Kirtland, Dr. Ward and myself. (*Tappan.*)

Physa sayii, Tappan, Amer. Journ. Sc. [1], XXXV, 369, pl. iii, f. 3 (1839).

I am unacquainted with this species. Judging from the description and figure, which I have copied above, I should not agree with Haldeman in placing it in the synonymy of *P. ancillaria.*

Physa vinosa, Gould.—Shell thin, ovate-globose, red, with minute spiral striæ and thin epidermis; spire obtuse; whirls four, the last very large; aperture ovate-lunate, three-fourths the shell's length, liver brown within; columella straight and thin. Length ¾, lat. ½ inch.

Fig. 137.



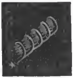
Physa vinosa.

Brought by Dr. C. T. Jackson from the Lake Superior region.

A remarkably inflated species, most like *P. ancillaria*, Say, but is not shouldered or widest behind the middle, nor tapering anteriorly. It is well distinguished by its thin structure, striated surface, wine-red color externally, and liver-brown internally. (*Gould.*)

Physa vinosa, Gould, Proc. Bost. Soc. N. H. II, 263, fig. (1847); in Agassiz' Lake Sup. 244, pl. vii, f. 10–11 (1850); Otia, 201.

Fig. 138.



Lingual dentition of *Physa vinosa.*

No. 9096 of the collection was presented by Prof. Agassiz from the original lot collected by him. Gould's description and figure are copied above.

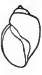
It has also been catalogued from Michigan.

The lingual teeth of the lateral rows of *Physa vinosa* are represented in Fig. 138.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9096	1	Lake Superior.	L. Agassiz	Original lot. Type.
9160	2	Owasco Lake, N. Y.	Mrs. H. W. Parker.	(Really *P. vinosa*?)

Physa ancillaria, Say.—Shell heterostrophe, sub-globose, pale yellowish; whirls rather more than four, very rapidly attenuated; spire truncated, hardly elevated beyond the general curve of the surface; suture not impressed; aperture but little shorter than the shell, dilated; labrum a little thickened on the inner margin. Length more than one-half of an inch.

Fig. 139.



Physa ancillaria.

The spire of this species is unusually short, truncated at tip like the *Paludina decisa*, nob.; and the suture is so inconspicuous as to give rise to the name which I have chosen for it. My brother, B. Say, obtained it in the Delaware River, near Easton, and Mr. Jessup collected numerous specimens in the Connecticut River, above Hartford. It may be distinguished from *P. heterostropha*, nob., by the shorter and truncated spire, inconspicuous suture, as well as by the more obtusely rounded junction of the labrum with the base, and by the general form. (*Say.*)

Physa ancillaria, Say, Jour. Acad. Nat. Sc. V, 124 (1825); Binney's ed. 114.—Haldeman, Mon. 27, pl. iii, f. 1–10 (1843).—Gould, Invert. 213, f. 142 (1841).—Adams, Shells of Vermont, 154 (1842).—DeKay, N. Y. Moll. 78, pl. v, 90 (1843).—Chemnitz, ed. 2, 20, pl. xii, f. 12–13.—Chenu, Man. de Conch. II, 480, f. 3550.—Anon. Can. Nat. II, 211, fig. (1857).

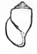
Physa obesa, DeKay, N. Y. Moll. 78, pl. v, f. 86 (1843).

This species appears to range from New England to Louisiana.

It is very numerous in the Delaware River at Burlington, on the muddy shores left bare at low tide. The animal burrows into the mud as soon as left by the water, and remains concealed until its return. On the piers of the wharves it crawls downwards with the fall of the tide and upwards again as it rises, thus keeping always near the surface.

Physa obesa, DeKay, appears to me identical with this species, judging only from his description and figure here copied.

Fig. 140.



Physa obesa.

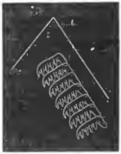
Physa obesa, DEKAY.—Shell ventricose; when young, very thin and fragile. Whirls four to five, rapidly attenuated to a minute and slightly elevated polished apex. Body whirl inflated, with its upper surface near the suture depressed, and forming an obtuse angle with the lower portion; suture semicanaliculate. Surface polished, with minute incremental lines. Aperture elliptical. Color pale horn. Length 0.5, of aperture 0.4 inch.

This species was communicated to me by Dr. Budd, who obtained it from the Mohawk and Hoosic Rivers, Rensselaer County. I have since received from the same gentleman specimens eight-tenths of an inch long, and quite solid with a stout callus. Some naturalists who have seen it are disposed to consider it as identical with *P. ancillaria*. (*DeKay.*)

Haldeman refers *Physa sayii*, Tappan, to *P. ancillaria*. I have considered it as distinct.

The lateral teeth of the lingual membrane of *Physa ancillaria* are represented in Fig. 141, as well as the line formed by one transverse row of the teeth.

Fig. 141.



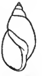
Lingual dentition of *P. ancillaria.*

Cat. No.	No of Sp.	Locality.	From whom received.	Remarks.
8096	9	Loup Fork.	......	......
8097	2	Hudson River.	Dr. J. Lewis.	......
8098	5	Cherry Creek.	......	......
8099	2	....	......	......
3523	6	30 m. w of Ft. Kearney.	......	......
8100	2	Ohio. [town.	S. M. Luther.	......
8101	9	Little R., near Shawnee-	......	......
8102	17	Ruby Valley.	Capt. J. H. Simpson.	......
8103	10	Hudson River, Albany.	Dr. J. Lewis.	......
8101	8	St Louis, Mo.	......	......
8105	3	Salisbury, Conn.	W G. Binney.	......
8106	8	Maine.	Dr. J Lewis.	Var.
8107	5	Yellowstone River?	Col A Vaughan.	......
8515	3	New York.	Dr. J. Lewis.	Cabinet series.
8517	1	Hiram, Ohio.	......	"
9248	8	Delaware River.	W. G. Binney.	......

Physa osculans, HALDEMAN.—Shell ovate or subglobose, ashy-red, thin; whirls five, suture impressed; aperture wide. Shell allied to *P.*

heterostropha, and presenting nearly the same varieties; translucent; texture very thin; lines of accretion fine; aperture wide, columella thick, with the fold obsolete, or but slightly impressed.

Fig. 142.



Physa osculans

Mexico? India?

Specimens of this shell were presented to the Academy of Natural Sciences by Dr. M. Burrough, and Mexico is given as the native country, but as this enterprising traveller also made collections in India, it is not impossible that they may be from the latter country. In either case, the species appears to occur in too great abundance to allow us to suppose that it is now characterized for the first time. Fig. 13 is from a specimen in Dr. Jay's collection, and may be a distinct species. (*Haldeman.*)

Physa osculans, HALDEMAN, Mon. p. 29, pl. ii, f. 13. excl. f. 11, 12 (= *heterostropha*) (1843).

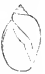
Subsequent researches have left no doubt of the habitat being Mexico.

The specimens figured on Plate 2, Figs. 11 and 13, of Haldeman's Monograph were subsequently referred to *Physa heterostropha*. I have, therefore, retained the name *osculans* (as he suggests) for the Mexican form with narrower aperture and more pointed spire. My figure is copied from his figure 13. See also remarks under *Physa heterostropha*.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8978	..	San Felipe Springs.	Beale.	......
9009	..	Mexico.	Acad. Nat. Sc. Phila.	......
9141	4	City of Mexico.	Lt. Beale.	......

Physa mexicana, PHILIPPI.—Shell imperforate, ovate, inflated. light horn-color, thin, dull and not shining, very finely wrinkled; the apical whirls occupy one-fourth of whole length; mouth wide; columellar fold broadly expanded, almost in the centre of the aperture.

Fig. 143.



Physa mexicana.

Shell ovate, inflated, formed by five whirls, and covered with fine broken microscopic wrinkles, parallel to the lines of growth, which prevents the surface from being shining. Whirls tolerably arched, forming a depressed suture, last whirl globose. Mouth longitudinally ovate, wide, the inner lip tolerably widely folded, the columella below the fold is appressed, prominent and rimmed—in one individual of only 6½‴ the outer lip is furnished with a smoky, reddish thickening. Height 8¾‴, breadth 5¾‴; ap. 7‴ long. 3¼‴ broad.

Hab. Mexico. (*Küster.*)

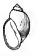
Physa mexicana, PHILIPPI in KÜSTER, Chemn. ed. 2, p. 5, pl. 1, f. 3–4.

I can give no other information regarding this species than that furnished by the original description copied above. One of Küster's figures also is given. The specimens in the collection no doubt are to be referred to the species.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8092	10	City of Mexico.	......	......
8093	8	Texas.	Lieut. Couch.	Cabinet series.
8519	2	City of Mexico.	......	......

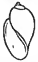
Physa heterostropha, SAY.—Shell sinistral, subovated; color pale yellow, chestnut or blackish; whirls four, the first large, the others very small, terminating rather abruptly in an acute apex; aperture large, somewhat oval, three-fourths of the length of the shell, or rather more; within of a pearly lustre, often blackish; lip a little thickened on the inside, and tinged with dull red.

Fig. 144.



Physa heterostropha, from Say's type.

Fig. 145.



Physa heterostropha, from Say's figure.

Inhabits with the first species (*L. catascopium*), and almost as numerous. Pl. 1, Fig. 6.

Animal resembles that of *Limnæa catascopium*, but is of a darker color and longer than its shell, the tentacula also are longer and setaceous; tail acute. The mantle is trifid at the base of the pillar lip, and at the upper corner of the aperture; deposits eggs the beginning of May; eggs enveloped by a transparent gelatinous substance; the nucleus, after a few days, appears of a pale or milk-white color, and not so well defined as those of *L. catascopium*. (*Say.*)

Limnæa heterostropha, SAY, Am. ed. Nich. Enc. pl. 1, f. 6 (1817, 1818, 1819): BINNEY'S ed. 46, pl. lxix, f. 6.

Physa heterostropha, SAY, Jour. Acad. Nat. Sc. II, 172 (1821): BINNEY'S ed. p. 68.—HALDEMAN, Mon. p. 23, pl. ii, f. 1–9 (1843).—GOULD, Invert. p. 211, f. 141 (1841).—ADAMS, Shells of Vt. 154 (1842).—DESHAYES in Lam. An. sans Vert. VIII, 402; ed. 2, III, 412.—DEKAY, N. Y. Moll. p. 76, pl. v, f. 82 (1843).—CHEMNITZ, ed. 2, p. 7, pl. i, f. 7, 8.—MRS. GRAY, Fig. Moll. An. pl. cccx, f, 9.—POTIEZ et MICHAUD, Gal. des Moll. I, 224, pl. xxii, f. 15, 16.—ANONY. Canada Nat. II, 209, fig. (1857).

Physa fontana, HALDEMAN, Mon. pt. 2, p. 3 of cover (1841).

Physa cylindrica, NEWCOMB in DEKAY, N. Y. Moll. 77, pl. v, f. 82 (1843).

Physa aurea, LEA, Trans. Am. Phil. Soc. VI, 18, pl. xxiii, f. 106; Obs. II, 18 (1839).—DEKAY, N. Y. Moll. 80, pl. v, f. 89 (1843).

Physa plicata, DEKAY, N. Y. Moll. p. 78, pl. v, f. 85 (1843).

Physa osculans, HALDEMAN, Mon. part, f. 11, 12.
Physa striata, MENKE, Syn. Méth. ed. 2, p. 132 (1830), teste Haldeman.
Physa subarata, MENKE, Syn. Méth. ed. 2, p. 132 (1830), teste Haldeman.
Physa charpentieri, KÜSTER in CHEMN. ed. 2, p. 23, pl. iv, f. 4–6.
Physa philippi, KÜSTER in CHEMN. ed. 2, p. 19, pl. iii, f. 3–6.
Physa inflata, LEA, Proc. Am. Phil. Soc. II, 32; Trans. IX, 7; Obs. IV, 7.
Helix heterostrophus, EATON, Zool. Text-Book, 195 (1826).
Bulla crassula, DILLWYN, Conch. tab. 1, 487, No. 36 = *fontinalis*, CHEMNITZ, Conch. IX, 33, pl. ciii, f. 879, 880, var. 3.—GMELIN, Syst. 3407. —SCHROTER, Einl. t. I, 261, *Helix* No. 84.
Cochlea neritoides, LISTER, Conch. pl. cxxxv, f. 34.

Of this species I have seen specimens from Texas and Georgia, and from as far north as Great Slave Lake. It ranges from the Atlantic to the Pacific. It is our most common species.

Mr. Say's types are still in the collection of the Philadelphia Academy. One is drawn in Fig. 144.

Physa fontana, formerly described as distinct, is referred to this species by Haldeman (Mon. p. 26). His description here follows:—

Physa fontana.—Animal dark fuliginous, foot as long as the shell; shell ovate, translucent, composed of three convex turns; apex eroded; suture well marked; labium nearly straight, with a slight fold; color yellowish-brown. Length ½ inch.

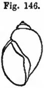
Inhabits cold springs in Pennsylvania.

Closely resembles *P. fontinalis* of Europe, but the foot is shorter. (*Haldeman.*)

Among the shells figured by Haldeman as *Physa osculans* appear some of this species. He says of them:—

Physa osculans.—The United States specimens of this shell will merge into *P. heterostropha*. One specimen, supposed to be from the West, is in reality from Mexico. This appears distinct, and may retain the name until I learn more about it. Although the aperture is narrow, some specimens in the Academy's collection have it very wide.

Fig. 146.



Physa osculans.

My opinion of the identity of *Physa striata* and *Physa subarata*, of Menke, is founded on his description alone, having seen no authentic specimens. His words are:—

Physa striata, MENKE.—Shell ovate, sub-opaque, reddish horn colored; last whirl longitudinally, elegantly and lightly striated; spire short, obtuse; internal margin of the labrum doubled, the exterior obsolete, white, the interior within the throat acute, red, showing a band without. Length 6½, breadth 4 lines.

Hab. Goshen, Mass. (*Menke.*)

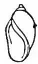
Physa subarata.—Shell ovate, pellucid, ashy horn-color; last whirl ventricose, somewhat furrowed transversely; spire short, acute; labrum thickened within. Length 5, breadth 3 lines.

Hab. Near Cincinnati in the Ohio River. (*Menke.*)

Not having seen authentic specimens of the following species, my opinion of their identity with *Physa heterostropha* is based on a study of the original descriptions and figures here copied.

Physa cylindrica, Newcomb.—Shell remarkably solid, sinistral, cylindrical. Whirls four, rapidly diminishing to the sub-acute apex. Surface moderately smooth, and polished with incremental lines. Suture impressed; outer lip with a sinuous margin, nearly straight, forming an acute angle with the body, effuse beneath; body whirl not convex, but rather flattened and cylindrical. Aperture narrow above, moderately dilated and elongated beneath. Columella smooth, arched with a conspicuous callus reflected over the umbilicus. Light rusty, or opaque rusty white; outer lip with a rusty sub-margin within. Length 0.5, of aperture 0.35.

Fig. 147.



Physa cylindrica.

This specimen was communicated by Dr. Newcomb, who obtained it from Red Creek, Wayne County. I have received the same shell under the name of *P. elliptica*, Lea; but it does not agree with his description. (*DeKay.*)

Physa aurea, Lea.—Shell sinister, rather inflated; golden color, pellucid, shining; spire rather short; whirls four; outer lip margined; aperture somewhat inflated.

Habitat. Hot Spring, Bath County, Virginia: P. H. Nicklin. My cabinet, and cabinet of P. H. Nicklin. Diam. .3, length .5 inch.

Fig. 148.

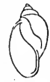
Physa aurea.

Mr. Nicklin informed me that he found the *Physa aurea* in a little watercourse by which a hot and a cold spring discharge their mingled waters. The former exhibits a temperature of 106° and the latter of about 56° of the scale of Fahrenheit. Near the meeting of the waters, one side of the little stream is cold and the other side hot; and multitudes of these beautiful *Physæ* are to be found on both sides of the line of junction, availing themselves of the power which the locality affords them of changing their climate according to their fancy. (*Lea.*)

Physa plicata, DeKay.—Shell moderately solid, subovate, elongate, symmetrical. Whirls four to five, rapidly attenuated to the apex. Surface with equidistant, longitudinal, and obsolete inequidistant transverse raised lines; suture distinct. Pillar-lip with a broad nacreous deposit. Aperture more than two-thirds of the total length, acutely oval. Amber, but coated with a black pigment; before this is removed, the aperture is bluish iridescent. Length 0.6–0.8, of aperture 0.2–0.3 inch.

This description is from specimens of the largest size, obtained from a pond on New York island. It moves like *P. heterostropha*, with great celerity on the surface of the water, with its mouth downward. In some specimens the revolving and longitudinal lines are so distinct, particularly the former, that the surface of the body whirl appears covered with distinct square facets. Some naturalists consider it only a variety of *heterostropha*. It differs in many important particulars from that species, but I regret that I have not been enabled yet to examine the animal. (*DeKay.*)

Fig. 149.

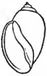


Physa plicata.

Physa charpentieri, Küster.—Shell ovate-conic, semi-transparent, smooth, shining, yellowish; whirls five, flattened; aperture oblique; columella subplicate, peristome thickened.

Shell small, ovate conical, very transparent, shining, smooth, dark yellow; spire depressed conical, whirls almost flat, scarcely separated by the suture, increasing moderately. The body whirl decreasing in size toward its base, which is like an inverted cone; mouth yellowish, tolerably wide, somewhat oblique; outer lip arched, acute and thickened within by a flesh-colored callus, which is visible on the exterior as a bright yellow band; columella convex, with an elevated fold, which is thin, broad, and sinuose. Height 4½, breadth 2⅓; aper. 3‴ long.

Fig. 150.



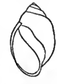
Physa charpentieri, enlarged.

Habitat. Baltimore: received by Mr. Bergrath v. Charpentier. (*Küster.*)

Physa philippi, Küster.—Shell ventricose-ovate, acute, striate, shining, diaphanous, yellowish horn color; spire short, conoid, rather acute; whirls five, rapidly increasing, convex; aperture elongate-ovate; columella concave; white, peristome sharp, with a ruddy band within.

Resembling in its general appearance *Physa heterostropha*, and in its straight axis and edge of the aperture, yet there are differences enough to distinguish it as a distinct species. The shell is ventricose, ovate, thin, and almost transparent, with waving wrinkles and yellowish horn-color. The apical whirls are rather short, comprising almost one-third of the length of the shell, increase rapidly in size, and are flattened convex, with a somewhat deep suture; body whirl ventricose; inner lip arched, rather wide; mouth long, ovate, almost as broad as long; columella concave, white, arcuate, and separated by a sinus from the

Fig. 151.



Physa philippi, enlarged.

termination of the outer lip, peristome adherent, somewhat arched, acute, with a reddish callus within. Height 7½, breadth 4; aperture 5‴ long.

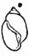
To the young of this species, or a variety, I refer a shell of which three specimens were sent to me from the Stuttgard Museum, as *Ph. heterostropha.* The shell is almost transparent, rather less ventricose, very shining, but corresponds with the above description in the form of the mouth, the axis, the reddish callus within the lip, and the curved reticulations. Height 5½, breadth 3″. (Fig. 5 is six times the natural size.)

Hab. North America. (*Küster.*)

Physa inflata, Lea, whose description is given below, appears to me a synonym of *Ph. heterostropha.* Fig. 152 is drawn from his type.

Physa inflata, Lea.—Shell inflated, dark, somewhat pellucid; spire somewhat elevated, acutely conical; whirls five; outer lip margined and inflated; aperture wide.

Fig. 152.



Physa inflata.

Hab. Virginia, between the Salt Sulphur and the Sweet Springs: Ph. Nicklin. My cabinet, and cabinet of Mr. Nicklin. Diam. .48, length .65 of an inch.

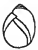
Two specimens were taken by Mr. Nicklin in a small stream which crosses the road in a gap in the main chain of the Alleghany Mountain between the Salt Sulphur and the Sweet Springs in Virginia. The gap is nearly level for several miles, and some of the streams run to the west and some to the east. This species seems to me to differ from any with which I am acquainted. It is perhaps most nearly allied to *P. heterostropha* (Say), but has a shorter aperture and is more inflated. (*Lea.*)

Dr. Gould tells me that a specimen of *Ph. heterostropha* in the Garden of Plants is labelled *Ph. arctistropha*, Jan. Villa (Disp. p. 32) quotes *Ph. cubensis*, Pfr., as a synonym of *Ph. heterostropha.*

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8047	3	Near Red River.	R. Kennicott.	......
8048	2	Black Hills.	......	......
8049	5	Fort Peirce.	......	......
8050	31	Big Sioux.	......	......
8051	3	Milwaukee, Wis.	I. A. Lapham.	......
8052	43	Mohawk, N. Y.	Dr. J. Lewis.	Vars.
8053	16	Southern Illinois.	R. Kennicott.	......
8054	1	Toledo, O.	F. A. Bossard.	......
8055	57	Ruby Valley.	Capt. J. H. Simpson, Army in Utah.	......
8056	4	Lac des Mille Lacs to L. of the Woods	R. Kennicott.	......
8057	8	Platte River, N. T.	......	......
8058	11	Centre County, Pa.	......	......
8059	7	Mohawk, N. Y.	Dr. J. Lewis.	......
8060	4	Chattanooga, Tenn.	A. Gerhardt.	......
8061	9	Erie Canal, N. Y.	Dr. J. Lewis.	......
8062	8	Nolachucky R., E. Tenn	......	......
8063	6	Milwaukee, Wis.	I. A. Lapham.	......
8064	23	Mohawk, N. Y.	Dr. J. Lewis.	......
8065	12	Maine.	"	......
8066	17	Northern Georgia.	A. Gerhardt.	......
8067	10	Hiram, O.	S. M. Luther.	......
8068	14	20 miles f. Ft. Kearney.	......	......
8069	11	Marietta, O.	W. Holden.	......
8070	1	....	......	Fossil?
8071	10	Westfield, Mass.	Dr. J. Lewis.	......
8072	5	Owasco Lake, near Auburn, N. Y.	"	......
8083	4	Hiram, O.	S. M. Luther.	......
8465	2	Southern Utah.	Capt. J. H. Simpson.	......
8466	80	Chilonacynck Depot.	A. Campbell.	......
8513	2	Massachusetts.	I. Lea.	Cabinet series.
8956	1	Northern Georgia.	Dr. Jones.	......
9090	100+	Mohawk, N. Y.	Dr. Lewis.	......
9091	20+	Grand Rapids, Mich.	"	......
9092	20+	Mohawk, N. Y.	"	......
9099	3	San Francisco	Judge Cooper.	......
9101	1	Washington Territory.	"	......
9104	20+	Mohawk, N. Y.	Dr. Lewis.	......
8974	..	Lake Utah.	Capt. Burton.	......
9179	50	Vermont.	Chittenden.	......
8528	1	Virginia.	W. G. Binney.	*P. aurea*, Lea.
9267	2	Isle la Crosse.	R. Kennicott.	......
9268	2	Great Slave Lake.	"	......
9269	1	Peace River.	"	......
9261	8	Virginia.	Dr. English.	......
9263	3	Hell Gate River.	Dr. Newberry.	......

Physa fragilis, MIGHELS.—Shell very thin and fragile, translucent, horn-color, obliquely ovate; whirls four; last whirl campanulate, suture deeply impressed at the enlargement of the last whirl; spire usually less than one, sometimes only one-fourth part of the length of the shell; labrum very thin, advanced; labium tumid with a thin, loosely adherent lamina. Length, .55 inch; greatest breadth, .4 inch; divergence, 90°.

Fig. 153.



Physa fragilis.

Animal of a very obscure, light-green color; whole surface of the body covered with oblong dark spots; foot shorter than the shell, lanceolate; tentacles nearly white, rather long, very slender; mouth blood-red. Its motions are exceedingly rapid; very timid, withdrawing itself on the least alarm. It is very tenacious of life, at least it is not easily *starved*. Three specimens are now before us in a tumbler of water, November 10th, where they have remained since the first of July. The water has not been changed more than half a dozen times, yet they are as brisk as when first taken; and moreover they have grown at least one-quarter. Exuviæ white, abundant, vermicular.

Cabinets of Boston Society of Natural History, Amherst and Middlebury Colleges, Mons. Largillier, S. S. Haldeman, J. W. Mighels, and C. B. Adams.

Hab. Monmouth, Maine: discovered in a mill-pond, after the water was drawn off, by Mr. N. T. True, to whom we are indebted for specimens.

This species is distinguished from *P. heterostropha* by the campanulate aperture, which is constant, shorter spire, tumid labium, and by its remarkable tenuity. (*Mighels.*)

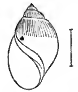
Physa fragilis, MIGHELS, Proc. Bost. S. N. S. I, 49 (1841).—MIGHELS & ADAMS, Bost. J. N. H. IV, 44, pl. iv, f. 12 (1842).—HALDEMAN, Mon. p. 31, pl. iv, f. 11–13 (1843).—DEKAY, prelim. Cat. N. Y. Moll. anno 1839, p. 32?

Dr. Foreman catalogues *Ph. fragilis* from the District of Columbia.

I have seen no authentic specimen of this species, which is admitted by Haldeman as distinct. I am inclined to believe it a variety of *Ph. heterostropha.* The original description and figure are copied above.

Physa semiplicata, KÜSTER.—Shell ovate, shining, semi-transparent, horn-colored; whirls five, convex, regularly wrinkled or grooved, the last smooth below; aperture broad; columella concave, sub-plicate; peristome straight, acute.

Fig. 154.



Physa semiplicata.

A species readily recognized by its peculiar sculpturing; the shell is longitudinally-ovate, shining, transparent, horn-colored; the apex is somewhat depressed, obtusely ovate, whirls arched, separated by a depressed, transversely wrinkled suture; body whirl large, ventricose, rapidly decreasing towards the rounded base, with delicate incremental striæ and longitudinally grooved on its upper half; mouth moderately high, and especially towards the base, broad; outer lip thin, straight, acute, curving and obtusely rounding below; columella short, concave, folded; fold broad, rather thin, white. Height 5, breadth 3‴.

Hab. Unknown. I once received a single specimen among some small American sea shells. (*Küster.*)

Physa semiplicata, KÜSTER in CH. ed. 2, p. 24, pl. iv, f. 7–9.

I can give no information regarding this species further than that contained in the original description and figure copied above.

Physa costata, Newcomb.—Shell ovate globular, horn-colored or reddish corneous; whirls four, the last inflated and roundly angulated above, armed with ten to fourteen prominent longitudinal ribs; apex acute; spire short; aperture ovate.

Mus. Cal. Ac. N. S. My cabinet.

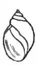
For this curious species of *Physa* we are indebted to Dr. Veatch, who collected several specimens at Clear Lake, California, most of them, however, immature. This is the only species provided with regularly arranged costæ that I have seen, and this character alone will be sufficient to separate it from all other described species of the genus. (*Newcomb.*)

Physa costata, Newcomb, Proc. California Ac. Nat. Sc. II, 104.

I have seen no specimen of this species, that sent me by Dr. Newcomb having been lost at sea.

Physa solida, Philippi.—Shell perforate, longitudinally ovate, solid, pale horn-color; whirls arched, apical whirls pointed, comprising one-third the whole length of the shell; mouth narrowed by the thickening of the lip; columella not folded.

Fig. 155.



Physa solida.

This is the heaviest species known to me, and is composed of six moderately arched whirls. The surface is sometimes reticulated, owing to the striæ of growth being crossed by other lines, which are owing partly to delicate lace-like prominences, and partly to a different degree of transparency of the shell. Suture tolerably defined. Mouth longitudinally ovate, columellar fold quite indistinct; the inner lip thick, adherent, forming an umbilicus; columella arcuate. Also the outer lip is thickened just within by a brownish-red callus, which appears white from the outside. Height 7¼‴, breadth 4¾‴; mouth 4¾‴ high, 2⅓‴ broad.

Hab. New Orleans: My brother.

Physa gyrina, Say, differs in having a thin, transparent shell, a shorter apex, as does also *Physa heterostropha*, Say, which has an obtuse apex; *Ph. acuta*, Dr., which resembles it in form, is smaller, thinner, and has an apex comprising only one-fourth of the whole length of the shell. (*Philippi.*)

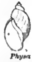
Physa solida, Philippi in Chemn. ed. 2, p. 6, pl. 1, f. 5, 6.

Of this species I have no fuller information than that contained in the original description and figure copied above.

The specific name appears to be preoccupied by Potiez and Michaud, Gal. des Moll. I, 227 (1838).

Physa virginea, Gould.—Shell slender and delicate, thin and shining, of a milk-white or porcelain-white color; spire about one-third the length of the shell, sharply pointed, of five or more moderately convex whirls, the last of which has a faintly angular appearance near the suture. Aperture narrow and elongated, two-thirds the length of the shell, acute behind. Columella short, delicate, slightly sinuate, folded. Length $\frac{5}{8}$, diam. $\frac{1}{4}$ inch.

Fig. 156.



Physa virginea.

Sacramento River, California: Budd.

A very well-marked species, of a porcelain-like structure and color, which appears not to be the consequence merely of blanching. It is less slender than *Ph. hypnorum*, and more like *Ph. gyrina*, Say, or *Ph. rivalis*, in form, but is a far more delicate shell, and one of the most elongated species. (*Gould.*)

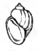
Physa virginea, GOULD, Proc. Boston S. N. H. II, 215 (1847); U. S. Ex. Ex. Moll. p. 120, f. 138, 138*a* (1852); Otia, 43.

Fig. 156 is drawn from a specimen lent me by Dr. Gould. Specimens have recently been added to the collection of the Smithsonian.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8122	10	San Francisco.	......	......
8507	..	....	......	......
8569	3	River Sacramento.	......	Cabinet series.
8728	3	San Francisco.	Rowell.	......

Physa humerosa, GOULD.—Shell subrhomboid, solid, smooth and white; spire acute; whirls five, tabulated; aperture equalling one-half to two-thirds the shell's length, rounded posteriorly; labrum expanded; columella scarcely plicate, callus hardly perforated. Length $\frac{1}{2}$ to $\frac{7}{16}$, breadth $\frac{3}{8}$ inch.

Fig. 157.



Physa humerosa.

Found by Dr. Thomas H. Webb and by W. P. Blake, in the Colorado Desert and at Pecos River.

The broadly tabulated whirls, with the acute, elevated spire, and foldless columella clearly distinguish this species. It is like *P. tabulata*, Gould, and the variety figured by Haldeman, as *P. ancillaria* (fig. 7), which he regards as a monstrosity; the deep suture and simple columella distinguish it from that species. (*Gould.*)

Physa humerosa, GOULD, Proc. Bost. Soc. Nat. Hist. V, 128 (1855); Otia, 216; Pac. R. R. Rep. V, 331, pl. xl, f. 1–5; Prelim. Rep. 23 (1855).

It has also been found at San Diego. The shell figured was presented by Dr. Gould to the Philadelphia Academy.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8113	4	Des. of Colorado R., Cal.	Lt. R. M. Williamson.	Dead shells.
8114	2	Creek leading to Desert, [Cal.	"	......
3252	1	San Diego.	P. R. R.	Cabinet series.

Physa pomilia, Conrad.—Shell with four volutions, horn-colored and polished; spire short conical; body whirl ventricose; aperture patulous. *Remark.* It resembles *Ph. heterostropha*, Say, but is much smaller and thinner.

Randon's Creek, near Claiborne, Alabama, adhering to limestone rocks. (*Conrad.*)

Physa pomilia, Conrad, Am. Journ. Sc. [I], XXV, p. 343 (1834).—DeKay, N. Y. Moll. 81 (1843).—Müller, Syn. Test. 1834 Prom. p. 35 (1836).

I have not seen this species, and have not been able to gather any further information regarding it.

Physa virgata, Gould.—Shell moderate, solid, smooth, elongate-ovate, ash-colored with longitudinal olivaceous stripes; spire elevated, acute; whirls four to five, well separated; aperture lunate, two-thirds the shell's length; columella moderately folded, but with a heavy callus, within yellowish-red. Length $\frac{3}{5}$, breadth $\frac{1}{4}$ inch.

Found by Dr. T. H. Webb, in the river Gila, and near San Diego.

Quite remarkable, as being the only species yet known which has variegated coloration. The stripes are found on some part of every shell, and many are prettily ornamented throughout. In size and proportions it may be compared with *Ph. microstoma*, Hald. (*Gould.*)

Fig. 158.

Physa virgata.

Physa virgata, Gould, Proc. Bost. Soc. Nat. Hist. V, 128 (1855); Otia, 216.

Also found at Los Angelos. An authentic specimen is figured above.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
4285	5	San Diego.	......	Cabinet series.
4400	5	....	......	......
5723	3	Los Angelos, Cal.	Cab. Acad. Nat. Sc.	......

Physa troostiana, Lea.—Shell elliptical, rather thick, yellow-brown, smooth; spire obtuse; sutures slightly impressed; whirls five, slightly convex; lip margined, thickened within; aperture small ovate, contracted.

Hab. Near Nashville, Tennessee: Dr. Troost. My cabinet, and cabinet of Dr. Troost. Diam. .25, length .45 of an inch.

This is a short obtuse species, about the size of *P. aurea*, Nob. The substance of the shell is very thick for the genus, and it is much more thickened within the margin than any species I have observed. The line along the margin of the lip is of a reddish-brown. The indentation of the columella is lower than usual. The aperture is about two-thirds the length of the shell. (*Lea.*)

Fig. 159.

Physa troostiana.

Physa troostiana, *Lea*, Tr. Am. Phil. Soc. IX, 7; Obs. IV, 7 (1844); Proc. II, 32 (1841).

Fig. 159 is drawn from the original specimen.

Cat. No	No. of Sp.	Locality.	From whom received.	Remarks.
9266	15	....	......	Teste Lea.

Physa triticea, Lea.—Shell subfusiform, pellucid, polished, reddish-chestnut; spire short, subacute; sutures sub-impressed; whirls four, sub-constricted; aperture elongate, with a line within.

Fig. 160.

Physa triticea

Shasta County, California: Dr. Trask. (*Lea.*)

Physa triticea, Lea, Proc. Acad. Nat. Sc. Phila. VIII, 80 (1856).

Mr. Lea's description is given above. My figure is drawn from a shell collected by Dr. Cooper, and determined by Mr. Lea, now in the Smithsonian collection.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9097	3	California.	Judge Cooper.	One figured. Type.
9268	3	....	......	......

Physa concolor, Haldeman.—Shell oval, spire produced, with the apex pointed; aperture oval, narrow, with the columella fold distinct. Color honey yellow.

Fig. 161.

Physa concolor.

Characterized by a single specimen brought from Oregon by Mr. Nuttall. (*Haldeman.*)

Physa concolor, Haldeman, Mon. pt. III, p. 3, cover (1841); p. 30, pl. ii, f. 10 (1843).—DeKay, N. Y. Moll. 81 (1843).

I have seen no specimens of this species. Fig. 161 is a copy of that of Haldeman.

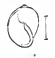
Subgenus PHYSELLA, Hald.

Shell globose, spire short; aperture elongate, very wide; columella with the fold well marked.

Physa globosa, Haldeman.—Shell globose, translucent; spire very short and rounded; aperture very long and wide, occupying considerably more than half the entire area of the shell; fold well marked; whirls three. FOREIGN ANALOGUE. *Amphipeplea involuta.*

This small species inhabits the submerged rocks in the rapids at the mouth of Nolachucky River, in Tennessee, under such circumstances as to convince me that it does not breathe the free air. I procured but two individuals, the shells of which are sufficiently translucent to exhibit light circular dots upon the black ground of the mantle—a common character in this genus. (*Haldeman.*)

Fig. 162.



Physa globosa.

Physa globosa, HALDEMAN, Mon. pt. 4, p. 4 of cover (1842); p. 38, pl. v, f. 10–12 (1843); Journ. Acad. Nat. Sc. Phila. VIII, 200 (1842); Pr. A. N. Sc. I, 78 (1841).—DEKAY, N. Y. Moll. p. 81 (1843).

Physella globosa, CHENU, Man. de Conch. II, 281, f. 3551.

The description and figure given above are copied from Haldeman, the latter enlarged.

SUBGENUS PHYSODON, HALD.

Shell solid, smooth, elliptical; outer lip thick; columella toothed.

Physa microstoma, HALD.—Shell elliptic, composed of four flattened whirls, separated by a distinct but very shallow suture; substance of the shell thick; spire shorter than the aperture, and ending in a point; aperture narrow elliptic, with a continuous peritreme, and the labium much thickened anteriorly; columella with two nacreous elevations or obtuse teeth. Color light brownish-ochraceous; columella and external periodical (varicose) bands, white, whilst the corresponding internal bands are chestnut.

Kentucky and Ohio.

This is a remarkable shell, and readily distinguished from all the American species of *Physa*, hitherto described, by the teeth upon the columella. (*Haldeman.*)

Fig. 163.

Physa microstoma.

Physa microstoma, HALDEMAN, Mon. p. 39, pl. iv, f. 12–14 (1853); Suppl. to pt. 1, p. 2 (1840).

Physodon microstoma, CHENU, Man. de Conch. II, 481, f. 3552.

Fig. 163 is a fac-simile of one of Haldeman's. His description is given above.

Cat. No.	No. of Sp.	Locality.	From whom received	Remarks.
9095	1	Kentucky.	Haldeman.	Type.

SPURIOUS SPECIES OF PHYSA.

Physa ampullaria, SAY, is mentioned by name only by LEA in Expl. of Nebraska, &c., House Doc. 2d Sess. 35th Cong. 1858–9, vol. II, pt. iii, p. 724. It may be a misprint for *ancillaria*.

Physa rivalis is catalogued without description by J. DE C. SOWERBY (in Richardson's Fauna Boreali-Americana, III, 315 (1836)), as is also *Physa turrita* with *Physa elongata*, SAY, and *Bulla hypnorum*, LINN. as synonyms.

Physa scalaris, JAY.—The shell is white, semi-transparent, and very fragile; the sutures of the whirls are very angular, and of the same character with the *Ampullaria scalaris*, D'Orb. It was presented to me by Count Castelnean, whose researches in this country will, without doubt, add much interesting matter to our knowledge of natural history.

Fig. 164.

Physa scalaris.

Hab. Everglades of Florida. (*Jay.*)

Paludina scalaris, JAY, Cat. ed. 3d, 1839, p. 112, pl. 1, f. 8, 9.—REEVE, Con. Icon. fig. (1863).

Physa scalaris, HALDEMAN, Mon. 34, pl. iv, f. 9 (1842).

The original description and figure are given above.

This species is undoubtedly distinct from any other known, but its generic place is doubtful. It does not seem to belong in *Physa* or *Paludina*. Specimens from Tampa Bay have been received by Mr. Anthony. There is a *Physa scalaris*, Dunker.

Physa planorbula, DEKAY, see *Planorbis trivolvis*.

Physa marginata, SAY, is mentioned by BELL in the Canadian Geological Report for 1858, p. 252. I know of no such species.

Physa fragilis, DEKAY, N. Y. Moll. Rep. 1839, 32, is mentioned by name only as a new species.

Physa fontinalis, SHEPPARD (Tr. Lit. and Hist. Soc. Quebec, I, 195, 1829).—Reversed, oval, transparent, smooth, horn-colored; spire short, subacute. (Near Quebec.) (*Sheppard.*) J. DE C. SOWERBY also quotes *P. fontinalis* without description, from Methy Lake to Bear Lake, in Richardson's Fauna Boreali-Americana, III, 315; also by G. B. SOWERBY in Tankerville Cat. p. 42 (1825); by MICHAUD in Mag. de Zool. 1837, cl. v, p. 4, and

Physa subopaca, SHEPPARD (Tr. Lit. and Hist. Soc. Quebec, I, 195, 1829).—Shell reverse, oval, semi-pellucid, grayish-yellow; spire short, acute. This species is rather more common than the foregoing (*P. fontinalis*); they are often found together at the Island; it resembles *fontinalis*, but is not so transparent. It is yellow without and white within. (*Sheppard.*)

FOSSIL SPECIES OF PHYSA.

Dr. Meek gives me the names of the following fossil species:—

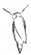
Physa secalina, EVANS & SHUMARD, Pr. Phil. Ac. 1854, 156.

Physa rhomboidea, MEEK & HAYDEN, Pr. Phil. Ac. 1856, 119.

BULINUS, Adanson.

Tentacles filiform, setaceous. Mantle simple-edged, and not reflexed over the shell. Foot long, acuminate behind.

Fig. 165.



Animal of *Bulinus*.[1]

Shell sinistrorsal, elongated, polished, thin; spire acuminated; aperture narrow, produced anteriorly; inner lip simple; outer lip acute.

Jaw (of *B. hypnorum*) strongly arched, narrow, cartilaginous, brown.

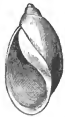
Bulinus differs from *Physa* in having a simple, unfringed mantle. The shell is also more slender and more highly polished. It is less common in North America than *Physa*, but usually appears of a large size. *Bulinus princeps*, Phillips, of Central America, and some of the South American species, are remarkably well developed.

Adanson's name *Bulinus* has priority over *Aplexa*, Fleming, and *Nauta*, Leach, and is accompanied by a careful description and excellent figure.

Bulinus aurantius, Carpenter.—Shell thin, ovate, smooth or marked with very delicate incremental striæ, orange horn colored, brownish on the spire; spire short, always eroded when adult; about seven swollen whirls; aperture somewhat dilated; lip very thin, arcuate; columella scarcely folded.

This fine species, which is generally named *Physa peruviana* in collections, is quite distinct from the types in the British Museum. It much more nearly approaches *Aplexa maugeræ*, which is believed to be a Caribbæan species (not Californian, as stated by Woodward, Man. II, 171). It differs in shape, which is never so elongated, and in color, which is almost always orange-horn, with a tendency to darker shades in rays, below the suture. Shell swollen, thin, glossy, with an extremely thin columellar lip projecting beyond the aperture, and indented at the base of the body whirl. The length of the spire varies in different specimens, as does

Fig. 166.



Bulinus aurantius.

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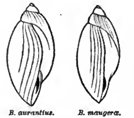
[1] I have been unable to obtain living specimens of a native species to figure. Fig. 165 is from Moquin-Tandon.

also the amount of convexity. The true *Aplexa peruviana* has a very prominent apex, with shouldered, swollen body whirl. Allowance must be made in the following measurements for the constant erosion of the apex. A slender specimen measures long. 1.23, long. spir. .27, lat. .63. A swollen specimen long. 1.25, long. spir. .24, lat. .7. The largest specimen must have measured 1.43; mean diverg. 60°.

Mazatlan; not common. (*Carpenter.*)

Fig. 167.



B. aurantius. *B. maugeræ.*

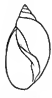
Aplexa aurantia, Carpenter, Brit. Mus. Cat. of Mazatl. Shells, p. 179 (1856).
Aplexa peruviana, Menke, Carpenter olim, teste Carpenter, l. c.

The shell figured above (Fig. 166) was received from Mr. Carpenter. Fig. 167 gives a comparison between *Bulinus maugeræ* and *aurantius*. They appear to me very nearly related, if not identical.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9142	1	Mazatlan.	Dr Gould.	Fig. 166, type.
9215	4	"	Judge Cooper.	......

Bulinus nitens, Philippi.—Shell longitudinally ovate, acute, imperforate, chestnut brown, very smooth and shining; apical whirls comprising one-fourth the whole length; columellar fold rather prominent, columella short, straight, compressed.

Fig. 168.



Bulinus nitens

It is the largest species of the genus, the whirls, five to six in number, form a conical apex, with moderate suture, the last one being inflated, smaller in the centre; a surface polished, unbroken by lines of growth, and dark brown color further characterize it; on the suture is a white band reminding one of *Natica glaucina;* columella straight, adherent, short, with a well-defined fold; inner lip thin and adherent throughout, divided into two portions, of which the lower is thicker and more expanded; no umbilicus. Long. 11¾''', diam. 6¾'''; ap. 8¼''' long, 3½''' broad.

Hab. Mexico.

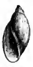
Ph. peruviana, Gray, from its description, appears to resemble it nearly, but differs in having a shorter body whirl, which comprises scarcely a fifth of the whole shell's length, and the whirls are more inflated. (*Philippi.*)

Physa nitens, Philippi in Küster, Ch. ed. 2, p. 5, pl. i, f. 1, 2.

I have seen no specimen of this species, but do not doubt its belonging to *Bulinus*.

Bulinus elatus, Gould.—Shell lanceolate-ovate, very thin, smooth and glistening, pale horn-color, colorless at suture; spire acute; whirls nearly six, distinct, slightly convex, the last one seven-eighths the length of the shell, ellipsoidal, nearly symmetrical at the ends; aperture three-fourths the length of the shell, narrow obovate-lunate, acutely rounded anteriorly; having on the pillar an imperfect fold, and a very thin callus on the body whirl. Length seven-eighths of an inch; breadth three-eighths of an inch; length of aperture five-eighths of an inch.

Fig. 169.



Bulinus elatus.

Inhabits Lower California: Maj. Rich.

An elongated species almost as slender as *P. hypnorum*, though very much larger, highly polished, with a very long aperture; pillar region tumid. (*Gould.*)

Physa elata, Gould, Bost. Journ. Nat. Hist. VI, 379, pl. xiv, f. 4 (1853); Otia, 185.

Aplexa elata, Carpenter, Br. Mus. Cat. of Mazatlan Shells, p. 180 (1856).

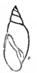
A copy of Gould's description and a figure of an authentic specimen are given above.

It is the thinnest and most delicate of the North American species.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9214	1	Mazatlan.	Judge Cooper.	……

Bulinus hypnorum, Linnæus.—Shell heterostrophe, pale yellowish, very fragile, diaphanous, oblong, whirls six or seven; spire tapering, acute at the tip; suture slightly impressed; aperture not dilated, attenuated above, about half as long as the shell; columella much narrowed near the base, so that the view may be partially extended from the base towards the apex.

Fig. 170.



Bulinus hypnorum.

Inhabits shores of Illinois. Length 7-10 inch; greatest breadth 3-10 nearly. Animal deep black, immaculate above and beneath; tentacula setaceous; a white annulation at base.

In the fragility of the shell, this species approaches nearest to *Limnæa columella*. It is very common in stagnant ponds on the banks of the Mississippi. When the shell includes the animal, it appears of a deep black color, with an obsolete testaceous spot near the base on the anterior side. Its proportions are somewhat similar to those of *P. hypnorum*. (*P. elongata, Say.*)

Physa hypnorum, Linnæus, &c.—Haldeman, Mon. 36, pl. v, f. 4–9 (1842).—Adams, Shells of Vermont, 154 (1842).

Physa elongata, Say, Journ. Acad. Nat. Sc. II, 171 (1821): Binney's ed. 68.—Gould, Inv. 214, f. 143 (1841).—DeKay, N. Y. Moll. 81, pl. vi, f. 346 (1843).—Anon. Can. Nat. II, 211, fig. (1857).

Physa glabra, DeKay, N. Y. Moll. 80, pl. v, f. 83 (1843).

Physa elongatina, Lewis, Bost. Pr. V, 122, 298 (1855).

Physa turrita, J. de C. Sowb. Fauna Bor.-Am. III, 315.

Aplexa hypnorum, Chenu, Man. de Conch. II, 481, f. 3556.

From Kansas to the District of Columbia, and from the Atlantic to the Pacific in the British Possessions, ranging as far north as Russian America. It is one of the species common to the three continents.

Mr. Say's type is still preserved in the Philadelphia Academy.

Physa turrita is quoted without description by J. de C. Sowerby in Richardson's Fauna Boreali-Americana (III, 315), with *P. elongata*, Say, and *Bulla hypnorum*, Linn. as synonyms.

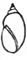
Physa elongatina was proposed as a specific name for some forms of *Bulinus hypnorum* by Dr. Lewis. No description was given. Subsequently the specimens were referred to *Physa glabra*, DeKay. The description and figure of the latter now follow:—

Physa glabra, DeKay.—Shell sinistral, smooth, shining, elongated, with five to six volutions; suture impressed; spire elongated into an acute apex. Body whirl more than half of the total length. Aperture oblong, acute above, rounded beneath, and half of the total length. Columella sinuous, slightly reverted with a faint oblique fold. Deep brownish-orange, approaching to copper.

Length 0.4, of aperture 0.2.

This shell, for which I am indebted to Dr. Budd, who obtained it from Lake Champlain, appears in some collections under the name of *P. aurea*, which it resembles in nothing but color. It approaches *P. elongata*, but differs in its impressed suture and the form of its columella. (*DeKay.*)

Fig. 171.



Physa glabra.

Cat. No.	No. of Sp	Locality.	From whom received	Remarks.
8087	3	Ann Arbor, Mich.	W. G. Binney	......
8088	7	Westbrook, Me.	Dr. J. Lewis.	......
8089	2	Apple Creek, lat. 47°.	......	......
8090	1	Yellowstone River.	......	......
8091	21	Grand Rapids, Mich.	Dr. J. Lewis.	......
8094	3	Minnesota.	I. A. Lapham.	......
8095	9	Milwaukee, Wis.	"	......
8518	5	Massachusetts.	Dr. J. Lewis.	Cabinet series.
8972	..	Ft. Resolution.	R. Kennicott.	......
9093	..	Grand Rapids, Mich.	Dr. J. Lewis.	......
9100	12	Michigan.	"	......
9102	..	Puget Sound.	Judge Cooper.	......
9172	4	Grand Rapids.	A. C. Currier.	......
9280	500	Yukon, m. of Porcupine.	R. Kennicott.	......
9282	7	Great Slave Lake.	"	......

Bulinus berlandierianus.—(See Appendix.)

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9308	3	Texas.	Lt. Couch.	Fig., type.

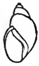
SUBGENUS ISIDORA, EHRENB.

Shell ovate, umbilicated; columella without any fold.

Diastropha of Guilding is also used for this subgenus. I am unacquainted with Ehrenberg's work, but have no doubt that his name is correctly used by H. & A. Adams.

Bulinus integer, HALDEMAN.—Shell oval, with a lengthened, pointed spire; whirls five, convex; suture deep; aperture obtuse posteriorly, peritreme continuous; labium not appressed anteriorly and without a fold. Color very pale yellowish-brown; labium, aperture, and varicose bands white. Sent to me from Indiana by Mrs. Say. (*Haldeman.*)

Fig. 172.



Bulinus integer.

Physa integra, HALDEMAN, Mon. No. 3, p. 3 of cover, 1841; p. 33, pl. iv, f. 7-8 (1843).—DEKAY, N. Y. Moll. 81 (1843).

Aplexus (*Isodora*) *integra*, CHENU, Man. de Conch. II, 481, f. 3556.

My figure is a fac-simile of one of Haldeman's, whose description also is given above.

Cat No.	No. of Sp.	Locality.	From whom received.	Remarks.
8110	56	Nolachucky R., Tenn.	......	......
8111	6	....	Dr. J. Lewis.	......
8112	5	Big Sioux.	......	......
8314	3	Tennessee.	......	Cabinet series.

Bulinus distortus, Haldeman.—Shell transverse, short, translucent and umbilicated; composed of three very convex whirls, and having a very deep suture; spire pointed, shorter than the aperture, which is oval, and almost cyclostomous, without any fold upon the labium or columella. Color very light yellowish-gray. Foreign analogue: *P. guildingii*, Sw.

Fig. 173.

Bulinus distortus.

Near St. Louis: Mr. Emerson. Kentucky and Ohio.

I am indebted to G. B. Emerson, Esq., President of the Boston Society of Natural History, for specimens of this curious shell, which were collected (by himself, I believe) near St. Louis. It is remarkable for the contorted spire and entire absence of a columellar fold. (*Haldeman.*)

Physa distorta, Haldeman, Mon. 35, pl. v, f. 1–3 (1842); Suppl. to pt. 1, 1840, p. 2.

Fig. 173 is a fac-simile of the outline of one of Haldeman's figures. His description is copied above.

Spurious Species of Bulinus.

Aplexa suturalis, Beck. Mexico. No description. Index, 117.
Bulinus fontinalis and var. *canadensis*, Beck; without description. Index, 117.
Bulinus pomilius, Conr., Beck, *l. c.* = *Physa.*
Bulinus crassula, Beck, p. 117; no description, and
Var. *typica* (= *P. heterostropha*);
  b. *striata* (= *P. striata*, Mke.);
  c. *minor* (= *P. arctistropha*, Crist. & Jan).
Bulinus subaratus, Beck, Ind. p. 118 = *Physa heterostropha?*
Bulinus gyrinus, Beck, *l. c.* 118 = *Physa gyrina.*
Bulinus maugeræ. See *Bulinus aurantius.*

Fossil Species of Bulinus.

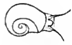
Dr. Meek furnishes me with the following list:—

Aplexa longiuscula, Meek & Hayden, MSS. (*Physa longiuscula*, Pr. Phila. Acad. 1856, 119.)

Aplexa subelongata, Meek & Hayden, MSS. (*Physa subelongata*, Pr. Phila. Acad. 1856, 120.)

PLANORBIS, Guettard.

Fig. 174.



Animal of *Planorbis bicarinatus.*

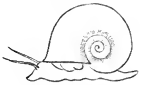
Tentacles slender, filiform. Foot short, ovate.

Shell dextral, discoidal; spire depressed, whirls numerous, visible on both sides; aperture crescentic, or transversely oval; peristome thin, incomplete, the upper margin produced.

Jaw single, superior, arched.

Lingual membrane — ?

Fig. 175.



Animal of *Planorbis.*

The genus *Planorbis* is widely distributed over the globe, but usually prefers the more temperate regions. It is found in every part of this continent, reaching into Mexico, and apparently much more abundant there than the other genera of the family.

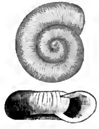
Most of the sections or subgenera are represented in North America. The South American *Taphius* is most nearly allied to the *Carinifex* of the Pacific coast.

The name *Planorbis* is now universally applied to the genus.

The species of this genus have a dextral shell, but the orifices of the generative, excretory, and respiratory organs are on the left of the animal, as in *Physa.* They are sluggish in their habits, preferring stagnant pools.

Say considered the shells sinistral, a fact which must be borne in mind while studying his descriptions. On this account I have represented the facsimiles of his figures in a different position from those of other authors.

Fig. 176.



Planorbis subcrenatus.

Planorbis subcrenatus, Cpr.—Shell tumid, very thin, horn-colored; whirls six, rounded, sutures impressed; with sharp radiating, somewhat crowded and occasionally minutely crenulated, ridges; aperture rounded, parietal wall small, scarcely touching the penultimate whirl; labrum slightly deflected, fuscous within; umbilicus deep. Long. .05, lat. .08, alt. .36. 8

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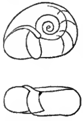
Oregon. T. Nuttall collected a single specimen.

"Differs from *Pl. trivolvis*, Say, in the acuteness of the ribs, and in their being more distant." Cuming MS. (*Carpenter.*)

Planorbis subcrenatus, CARPENTER, Proc. Zool. Soc. 1856, p. 220.

The above is the original description of Mr. Carpenter. The specimen from which it was drawn is figured in my Fig. 176. It has been found in Washoe (*Newcomb*).

Fig. 177.



Planorbis lentus.

Planorbis lentus, SAY.—Shell dull brownish or yellowish-brown, sub-carinate above, particularly in the young shell; whirls nearly five, striate across with fine raised, subequidistant lines, forming grooves between them; spire concave; aperture large, embracing a large portion of the penultimate volution; labrum more acutely but not very prominently arcuated above, its basal portion horizontally subrectilinear, in the adult, and not extending below the level of the base.

I obtained this species in the canal at New Orleans, and am indebted to Mr. Maclure, and also to Mr. Barabino, for many fine specimens collected in the vicinity of that city. I also found the same species at Ojo de Agua, Mexico, when travelling in that country with Mr. Maclure. It differs from the *P. trivolvis* in having the labrum less prominent above, and the basal portion of this part being in the adult horizontally subrectilinear, so as not to touch a plane on which the base of the shell may rest; the aperture also is more transverse. (*Say.*)

Planorbis lentus, SAY, Am. Conch. pt. 6, pl. iv, f. 1 (1834): BINNEY's ed. 210, pl. iv, f. 1.—HALDEMAN, Mon. 18, pl. iii, f. 4–6 (1844).—DEKAY, N. Y. Moll. 60, pl. v, f. 80*, *a*, *b* (1843).—ANON. Can. Nat. II, 203 fig. (1857) (not GLD. = *fallax*).

Fig. 177 is a fac-simile of that of Mr. Say, whose description also is given above.

It is said to have been found at several points between New Braunfels, Texas, and South Carolina, and in New York.

Prof. Adams refers the species to *Pl. corpulentus* in the List of Middlebury Shells, to *trivolvis* in the Shells of Vermont.

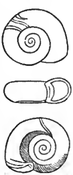
Gould's description and figure of *Pl. lentus* is referred by Haldeman to *Pl. fallax*.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8178	3	Yellowstone River.	......	......
8198	40	Big Sioux.	......	......
8496	3	....	W G. Binney.	Cabinet series.
9184	2	South Carolina.	Gen. Totten.	......
9186	5	Lynn, Mass.	Dr. Prescott.	......

Planorbis tumidus, Pfeiffer.—Shell opaque, pale horn-colored or smoky, densely and finely striated, umbilicated above, slightly concave below; whirls five, convex, sub-carinated on each side, rapidly increasing, separated by a deep suture; aperture oblique, lunate-rounded, somewhat kidney-shaped.

Shell rather large, and somewhat shining, pale horn-colored, or sometimes reddish-brown or greenish, thick and delicately grooved; concave and deeply umbilicated in the centre above, as also below, without the well-defined umbilicus, so that the apical whirls are visible; whirls five or five and a half rapidly increasing, separated by a deep suture, and obsoletely grooved above and below; mouth oblique, roundly-lunate and somewhat obtusely angular; columella simple, covered with a thin white callus. Greater diameter of the largest specimen 9 lines, height at the aperture 3 lines.

Fig. 178.



Planorbis tumidus.

Hab. Common at San Juan (Pfeiffer), Havana (de la Sagra), swamps at Vera Cruz and Vamba (Leebmann, Hegewish), Mexico (D'Orbigny).

Nearly allied to *Plan. tenagophilus*, D'Orb. Young specimens resemble a flat form of *Pl. trivolvis.* Some kindly sent by Prof. Steenstrup, of Copenhagen, are characterized by stouter, smaller shell, and finer grooves, and also paler color (pl. v, f. 1–3) (*Küster, l.* c.).

Planorbis tumidus, Pfeiffer in Wiegm. Archiv. 1839, 354; in Küster, Ch. ed. 2, p. 39, pl. vii, f. 10–12; pl. ix, f. 1–3.

Planorbis caribæus, Orbigny, Sagra's Cuba, 193, pl. xiii, f. 17–19.

Planorbis intermedius, Philippi, Conch. Cah. I, tab. i, 17, 16, f. 18, 19. Var. fig. malae. an. *Plan. capillaris*, Beck ? Ind. p. 110.

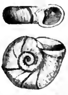
Guatemala: Rev. H. B. Tristam. The description and figures given above are copied from Chemnitz, ed. 2.

I have followed Küster in quoting the synonymy of this species.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8174	4	Texas.	Lt. Couch.	"Forests."
8175	8	"	G. Wurdeman	......
8176	11	"	" & Dr Berlandière.	......
8177	29	"	Lt. Couch.	......
8502	..	"	"	Cabinet series.

Planorbis glabratus, SAY.—Shell sinistral; whirls about five; glabrous or obsoletely rugose, polished, destitute of any appearance of carina; spire perfectly regular, a little concave; umbilicus large, regularly and deeply concave, exhibiting all the volutions to the summit; aperture declining, remarkably oblique with respect to the transverse diameter. Breadth nearly nine-tenths of an inch.

Fig. 179.



Planorbis glabratus.

Inhabits South Carolina. Cabinet of the Academy.

Presented to the Academy by Mr. L'Hermenier, of Charleston, an intelligent and zealous naturalist. He assured me that this species inhabits near Charleston. It somewhat resembles large specimens of the *P. trivolvis*, of the American edition of Nicholson's Encyo., but differs in the total absence of carina, and in having a more smooth and polished surface, as well as a declining and more oblique aperture, and a more profound and much more regularly concave umbilicus. (*Say.*)

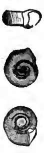
Planorbis glabratus, SAY, Jour. Acad. Nat. Sc. I, 280 (1818); Nich. Enc. 3d ed. (1819): BINNEY's ed. p. 51, 61.—HALDEMAN, Mon. 11, pl. ii, f. 1-3 (1844).—DEKAY, N. Y. Moll. 66 (1843).

It is said to be found in Mexico, Louisiana, and Oregon, which, with Say's locality, gives a wide range to this species.

My figure of *Pl. glabratus* is drawn from a specimen corresponding with that figured by Haldeman, and generally acknowledged to be this species.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8195	17	St. Simon's Island, Ga.	Dr. J. Lewis.	......
8500	5	"	"	Cabinet series.

Fig. 180.



P. tumens.

Planorbis tumens, CARPENTER.—Shell rapidly swelling, small, horn or reddish smoke-colored; whirls four or five, with light waving striæ; sutures deeply impressed; on one side subangulate or subcarinate near the suture, on the other rounded; umbilicus very deep; aperture with a sinuous edge, one side standing out above, flattened below, the other flattened above, produced below, capacious and rounded; labium very thin.

This species is so variable that it is difficult to describe it so as to include all the specimens and yet separate it from its congeners. Aberrant individuals on the one side closely approach *P. affinis*, on the other *P. lentus*, Say. The three may hereafter be proved identical; but the general habit of *P. tumens*, as gathered from repeated examinations of many hundred specimens, is sufficiently distinct from the Jamaica species. The whirls are more rapidly enlarging, more swollen, and the lip more shouldered. An unusually large specimen measures long. .63, lat. .58, alt. .27.

Hab. Mazatlan; not uncommon. Liverpool collection. (*Carpenter.*)

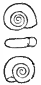
Planorbis tumens, CARPENTER, Brit. Mus. Mazatlan Cat. 181.
Planorbis affinis, CARPENTER in Cat. Prov. (not ADAMS).
Planorbis tenaglophilus, MENKE, Zeit. f. Mal. 1850, p. 163 (not D'ORBIGNY, teste CARPENTER).

Fig. 180 is drawn from a specimen received from Mr. Carpenter. The original description is given above.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9125	5	San Francisco.	Judge Cooper.	......
9121	11	Petaluma.	Dr. Gould.	Type.
9146	1	....	"	Figured. Authentic.

Planorbis havanensis, PFEIFFER.—Shell discoid, thin, pale horn-colored or yellow, very delicately and densely striate; above and below planulate, and having an umbilicus in the centre; whirls five, subrotund, moderately increasing, separated by a deep suture; aperture oblique, roundly lunate.

Fig. 181.



Planorbis havanensis.

Shell discoid, thin, fragile, pale horn or yellowish in color, with very delicate and numerous striæ; both above and below flattened and umbilicate in the centre, but somewhat more deeply so above; whirls five, regularly increasing, rounded, separated by a tolerably deep suture; aperture oblique, round, somewhat lunate. Diam. (greatest of largest specimen) about 4 lines, height 1¼.

Received from Herr Dr. L. Pfeiffer, who found it in swamps near Havana. Also from Dr. F. Rœmer, who found it in Texas.

It has many analogies with *Pl. peregrinus*, D'Orb., of Chile. (*Küster.*)

Planorbis havanensis, PFEIFFER in Wiegm. Arch. f. Nat. 1839, I, p. 354. —KÜSTER in CHEMNITZ, ed. 2, p. 58, pl. x, f. 32–34.
Planorbis terverianus, D'ORBIGNY, Voy. Cub. 194, tab. xiii, f. 20–23.

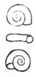
I have seen no specimen of this species; the above extracts and figures are from the second edition of Chemnitz.

The following is Pfeiffer's description:—

Planorbis havanensis.—Shell discoidal below, above more concave, light horn-color; whirls four, regularly increasing, terete; aperture lunate. Diam. 5, alt. 1½'''. (*Pfeiffer.*)

Planorbis liebmanni, Dunker.—Shell discoidal, pale horn-colored, subvitreous, substriate, almost smooth, shining, flattened above, concave below, umbilicated on both sides; whirls four, convex, moderately increasing; aperture per-oblique, slightly dilated, rather rounded, almost heart-shaped.

Fig. 182.



Planorbis liebmanni.

Shell discoid, light horn-colored, very delicately striate, almost smooth, very transparent and shining; flat or slightly convex above, below somewhat concave; umbilicate on both sides; whirls four, rounded, slightly involute, compact, separated by a somewhat deep suture; aperture very oblique, somewhat widened, irregularly rounded, almost heart-shaped. Greatest diam. 3½ lines, height hardly 1 line.

Hab. Vera Cruz: Herr Prof. Liebmann, of Copenhagen.

Specimens kindly furnished by Herr Prof. Steenstrup, of Copenhagen, have a hard, firm, chalky incrustation. (*Dunker.*)

Planorbis liebmanni, Dunker in Chemn. ed. 2, p. 59, pl. x, f. 32–34.
Planorbis gracilentus, Gould, Pr. Bost. Soc. V, 129 (1855); Otia, 217.

Römer (Texas) quotes it from New Braunfels. The above description and figure are from Chemn., ed. 2.

Planorbis gracilentus, Gould, appears to be identical with this species. It is, at least, the same as the shells in Nos. 8179, 8180, and 8504, which I have referred to *Plan. liebmanni* after a study of the description and figures copied above. No. 9205, from the Colorado Desert, is an authentic specimen of Gould's *Pl. gracilentus.* His description here follows, and an enlarged drawing of a specimen received from him. Dr. Gould suggests its identity with *Pl. haldemani,* but the aperture of that species is campanulate.

Planorbis gracilentus, Gould.—Shell discoidal, compressed, white, finely striated; right side flattened; left side moderately concave; on each side four rounded whirls, the last obtusely carinated at the periphery; aperture quite oblique, roundedly oval. Axis ⅛, diam. ½ inch.

Fig. 183.

Planorbis gracilentus.

Found by Dr. T. H. Webb, in the great Colorado Desert low lands.

No North American species, of equal size, can be compared with this well-marked, wheel-shaped species. Very small specimens are like large specimens of *P. deflectus*, Say. A species from the Nile is very similar. (*Gould.*)

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8179	2	Texas.	G. Wurdeman.	......
8186	25	"	Lieut. Couch.	......
8704	8	"	"	Cabinet series.
9205	1	Colorado Desert.	A. A. Gould.	(Type of *Pl. gracilentus* figured.)

Subgenus PLANORBELLA, Hald.

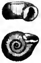
Shell with the whirls few; aperture campanulate or bell-shaped, prominent.

Planorbis campanulatus, Say.—Sinistral; whirls longer than wide; aperture sub-campanulate.

Inhabits Cayuga Lake. Cabinet of the Academy.

Shell sinistral, not depressed; whirls four, slightly striate across; longer than wide; spire hardly concave, often plane; body whirl abruptly dilated near the aperture and not longer behind the dilatation than the penultimate whirl; suture indented, well defined to the tip, the summits of the volutions being rounded; aperture dilated; throat narrow abruptly; umbilicus profound, the view extending by a minute foramen to the apex. Greatest length of the body whirl one-fourth of an inch; breadth from tip of the labrum one-half of an inch; at right angles to the last, two-fifths of an inch.

Fig. 184.



Planorbis campanulatus.

This shell abounds in some of the small streams which discharge into Cayuga Lake, where it was collected by Mr. Jessup, who presented specimens to the Academy and to me. It is readily distinguished from other species, by the sudden dilatation of the outer whirl, near the aperture in the adult shell, forming a large oval chamber. The summit of the outer whirl, behind the dilated portion, is not, or hardly elevated above the summits of the other volutions. (*Say.*)

Planorbis campanulatus, Say, Journ. Acad. Nat. Sc. II, 166 (1821): Binney's ed. p. 64.—Haldeman, Mon. 9, pl. 1, f. 7–11 (1844).—Gould, Invert. 204, f. 133 (1841).—Adams, Shells of Vt. 155 (1841).—DeKay, N. Y. Moll. 61, pl. v, f. 99* *a*, *b* (1843).—Küster in Chemn. ed. 2, p. 52, pl. ix, f. 7–10.—Anon. Can. Nat. II, 204, fig. (1857).

Planorbis bellus, Lea, Tr. Am. Phil. Soc. IX, 6 (1844); Proc. II, 32 (1841).

Planorbis bicarinatus, Sowerby, Gen. pl. iv.

Planorbella campanulata, Chenu, Man. de Conch. II, p. 482, f. 3559.

Helix angulata, Sheppard, teste J. de C. Sowerby, Fauna Boreali-Americana, III, 315.

It ranges from New England through the northern tier of States to Minnesota.

My decisions in regard to the synonymy of this species are based on actual examination of Mr. Lea's type of *Pl. bellus*, which is an immature shell, and the description copied below.

Planorbis bellus, Lea.—Shell orbicular, above regularly concave, beneath widely umbilicate, greenish-yellow, closely and beautifully striate; whirls four, carinate above, sub-carinate below; lip sharp, aperture small, within reddish-brown.

Hab. Tennessee: Dr. Troost. My cabinet, and cabinet of Dr. Troost. Diam. .40, length .22 of an inch.

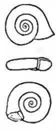
A single specimen only of this species was received from Dr. Troost. Like the *P. corpulentus* (Say), it is covered with striæ, but in the *bellus* they are much closer and more regular. It is a much less inflated shell, and more regular in its form. (*Lea.*)

Planorbis bicarinatus of Sowerby's Genera of Shells seems to represent this species rather than *bicarinatus*.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8199	3	Milwaukee, Wis.	I. A. Lapham.	......
8201	2	Lake of the Woods.	R. Kennicott.	......
8202	1	Quasquitan, Ia.	E. C. B.	......
8203	1	Big Sioux.	......	......
8204	3	San Cloud, Min.	R. Kennicott.	......
8205	11	Little Lakes, N. Y.	Dr. J. Lewis.	......
8206	35	....	......	......
8207	1	Aztalan, Wis.	S. F. Baird.	......
8495	3	Michigan.	W. G. Binney.	Cabinet series.
9178	100+	Vermont.	Chittenden.	......
9181	5	Lynn, Mass.	Dr Prescott.	......
9281	9	Otter Tail Creek, Min.	R. Kennicott.	......
9266	4	Great Slave Lake.	"	......

Planorbis haldemani, Dunker.—Shell discoidal, depressed, rather solid, pale horn-colored (?), obsoletely striate, rather concave both above and below, almost flat, pitted in the middle of each side; whirls five, oval, rather involute; aperture ovate heart-shaped, dilated, almost campanulate.

Fig. 185.



Planorbis haldemani.

Shell discoidal, flat, rather solid, delicately striate, very slightly concave above and below, as well as almost flat, with a pit in the centre. Whirls five, moderately increasing, not very involute, ovately-rounded. Aperture oval, almost heart-shaped, widened, resembling that of *Plan. campanulatus*, which is bell-shaped. Greatest diam. 6 lines, height almost 2 lines.

Mexico: Prof. Liebmann.

The specimens are worn, but apparently were pale horn-colored when fresh. (*Küster.*)

Planorbis haldemani, DUNKER in CHEMN. ed. 2, p. 59, pl. x, f. 38–40 (not ADAMS).

The above are copies of the original description and figures of this species.

The name has been used by Adams, Contr. to Conch. III, 43, Oct. 1849. This will probably necessitate another name for Dunker's shell. I cannot ascertain the date of his description in the second edition of Chemnitz.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8196	31	Lake Aculeo, 30 m. S. S. W. of Santiago.	......	"Thrown upon the beach."
8499	3	Lake Aculeo, 30 m. S. S. W. of Santiago.	......	Cabinet series.

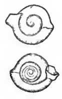
SUBGENUS ADULA, H. ADAMS.

Shell with the whirls rounded and numerous, deeply umbilicated on the upper, and convex on the under side; aperture campanulate.

Planorbis multivolvis, CASE.—Shell about five-eighths of an inch in diameter; whirls seven, about half the last whirl overlapping the preceding one, sometimes the last whirl suddenly distorted and expanded for the last half of its length; right side concave, left side slightly acuminate and considerably carinate; throat campanulate; aperture opening towards the left, but projecting on both sides beyond the preceding whirl.

This shell, also, I obtained from Captain Stanard, who found it in the northern part of Michigan. It is very distinct from any *Planorbis* I have met with, or have been able to find any description of. I have named it from its strong characteristic—a greater number of whirls than usual in the genus. (*Case.*)

Fig. 186.



Planorbis multivolvis.

Planorbis multivolvis, CASE, Am. Journ. Sc. [2], III, 101, f. 4, 5 (1847).

Adula multivolvis, H. ADAMS, Proc. Zool. Soc. Lond. 1861, p. 145.

I have heard of this very peculiar species being found at no other locality. No. 9122 of the collection was received from Mr. Case by Dr. Gould, and by him presented to the collection. The original description and figure are given above.

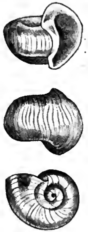
Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9122	1	……..	Dr. Gould.	……

SUBGENUS HELISOMA, SWAINS.

Shell ventricose, the spire sunk below the body whirl; whirls few, often angulated.

Planorbis ammon, GOULD.—Shell large, discoid, subconic, delicately striate; left side broadly and deeply concave, showing four obtusely carinated whirls; right side concave, showing two and a half rounded whirls; aperture ovate-triangular, sometimes quite expanded on each side; axis ⅝ to 1, diam. ¼ to ½ inch.

Fig. 187.



Planorbis ammon.

Found by Dr. T. H. Webb, in the Clenaga Grande, or Colorado Low Desert, and also by Mr. W. P. Blake.

The specimens differ greatly in size, and in the development of the aperture; but all agree in the peculiar slope of the outer volution, giving them a conical or dome-shaped form when lying on the left side. Fully developed specimens are much like *P. corpulentus*, Say, but the shape of the volution and aperture differ, and the striæ are less coarse, and more like *P. glabratus*, Say. (*Gould.*)

Planorbis ammon, GOULD, Proc. Bost. Soc. Nat. Hist. V, 129 (1855); Otia, 216; Pac. R. R. Rep. V, 331, pl. xi, f. 12–18 (1857); Prel. Rep. 23 (1855).

Planorbis traskii, LEA, Pr. Phil. Acad. Nat. Sc. 1856, VIII, 80.

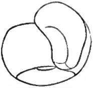
It is also said to have been found in lagoons, Sacramento Valley, and Ocogo Creek, California. Fig. 187 is copied from those of Gould.

No. 9169 of the collection was labelled "*P. traskii*," by Dr. Trask. It appears to be identical with Gould's shell. Fig. 188 is drawn from Mr. Lea's original specimen of *P. traskii*, and his description is given below.

Planorbis traskii, Lea.—Shell large, dark horn-colored, subcylindraceous, minutely, regularly and closely striated, deeply and broadly umbilicated above; more excavated below; whirls five, acutely carinated at the periphery above, obtusely carinated below; aperture ear-shaped.

Kern Lake, Tulan Co., California: Dr. Trask. (*Lea.*)

Fig. 188.



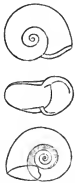
Planorbis traskii.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8576	3	Ocogo Creek, Cal.	Lt. R. S. Williamson.	"Varying from type," A. A. G. Cab. ser.
9124	1	Kern Lake, Cal.	Dr. Cooper.	(Sub nomine *traskii.*)
9169	1	Monterey County, Cal.	Dr. Trask.	"
9258	7	Klamath Lake, Or.	Newberry.	......
9260	7	Rhett Lake, Cal.	"	......
9317	12	E. of Ft. Colville, W. T.	N. W. Boundary Surv.	......

Planorbis tenuis, Phil.—Shell large, thin, rather shining, very delicately striate, pale horn or smoke-colored; concave on each side, umbilicated above, deeply excavated below; whirls swollen, rounded, above narrow, subcarinated below and rapidly increasing; aperture sinuous, sub-auriculate. (*D.*)

Shell large, very thin, densely and sharply grooved, transparent, pale horn-color, yellowish or sometimes reddish-brown, not very highly polished; five rapidly increasing involute whirls, rounded and ventricose above, below narrow and grooved near the suture; carina usually more prominent on the inner whirls, being often obsolete on the body whirl. Upper side umbilicated, so that the deeply depressed first whirl is covered by the rest; the under side, on the other hand, is almost funnel-shaped, yet flat in the middle. The auricular aperture is somewhat raised above; the parietal wall has a very delicate callus. Breadth 7–9 lines, height 3¾–5 lines.

Fig. 189.



Planorbis tenuis.

Common among graves near Mexico, with *Limnæus subulatus*, Dkr.: Schiede and David.

Resembles *Plan. peruvianus*, Brod., which has a smaller, thicker shell, and very thick and broad lip. (*Küster.*)

Planorbis tenuis, Philippi, Conch. tab. 1, 17, 16, f. 23–25.—Küster in Chemn. ed. 2, 45, pl. ix. f. 14–19.

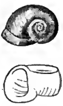
Planorbis mexicanus, Ziegler in litt.

The above description and figure are copied from Chemnitz, ed. 2.

Cat. No	No. of Sp.	Locality.	From whom received.	Remarks.
8172	7	City of Mexico.	Maj. Rich.	......
8506	5	"	"	Cabinet series.

Planorbis corpulentus, Say.—Shell dextral; whirls more than three, rather rugged with coarse wrinkles, much higher than wide; superior surface much flattened, and edged by an abrupt acute line, which is distinct to the aperture; sides hardly rounded and terminating below by another abrupt edge, which is not quite so definite and acute as the superior one; spire slightly concave; umbilicus exhibiting a portion of each of the rapidly retiring whirls to the apex; aperture longer than wide, the superior part extending higher than the preceding volution, and the inferior volution declining much lower than the inferior line of the same volution. Greatest breadth three-fourths of an inch; length of aperture nearly half an inch; length of the penultimate whirl near the aperture rather more than three-tenths of an inch.

Fig. 190.



Planorbis corpulentus.

Inhabits Winnepeck River, Winnepeck Lake, Lake of the Woods, and Rainy Lake; common.

Of this species I collected numerous specimens, but had the misfortune to lose them all, as well as a great number of interesting terrestrial and fluviatile shells, on our return to the settlements, and I am indebted to the liberality of Dr. Bigsby for the individual above described. It is closely allied to *trivolvis*, Nob., but is much less rounded on the sides of the whirls, the carinæ are more prominent, the upper side is much more horizontally flattened, the labrum is less rounded, and the whole shell is larger and higher in proportion to its width, and the aperture extends both above and below the penultimate whirl. (*Say.*)

Planorbis corpulentus, Say, Long's Ex. II, 262, pl. xv, f. 9 (1824): Binney's ed. p. 128, pl. lxxiv, f. 9.—? Haldeman, Mon. 19, pl. iii, f. 7-9 (1844) —? Gould, U. S. Ex. Ex. Moll. 114, f. 130, 130 *a*, 130 *b* (1852).

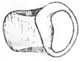
? *Helisoma corpulenta*, Chenu, Man. de Conch. II, 482, f. 3560.

Animal dark emerald green, profusely dotted above and below with small white points, paler beneath. Head large, tentacles very slender. (*Gould.*) See Fig. 175, p. 103.

I am inclined to believe that Say had before him a form of *Plan. trivolvis* when he drew his description of *Plan. corpu-*

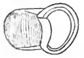
lentus. His original description and figure are given above. Large, globose forms of *Pl. trivolvis* are usually called *Pl. corpulentus* in collections, and have often been so labelled in the envois of my correspondents. DeKay also describes and figures a specimen of *P. trivolvis* as *Pl. corpulentus.* Adams (Shells of Vt.) refers *P. corpulentus* to *Pl. trivolvis*, and so Gould appears to decide in the Invert. of Mass. I have myself seen no specimens from the localities visited by Mr. Say while on Long's Expedition that are not forms of *Pl. trivolvis.*

Fig. 191.



Form of *Pl. corpulentus.*

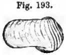
Fig. 192.



Form of *Pl. corpulentus.*

The shells referred to *Pl. corpulentus* by Haldeman in his Monograph, by Gould in the Exploring Expedition Mollusca, and figured by Chenu (*l. c.*), and referred to in the following museum register, are all from the West Coast. I believe them to be distinct from *Pl. corpulentus* of Say, and that they should receive another specific name. The description of the animal given above is drawn from one of this form. One of Haldeman's figures is copied in my Fig. 192. It will be found to agree with Fig. 191, drawn from one of the specimens in the Smithsonian collection, No. 8119. A curiously indented form from the West Coast is figured in Fig. 193.

Fig. 193.



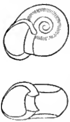
Form of *Pl. corpulentus.*

P. corpulentus is catalogued from Guatemala by Mr. Tristam.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8116	1	Pacific Coast.	......	......
8117	12	"	......	......
8118	8	Columbia River, Or.	Com. Wilkes.	......
8119	5	" ?	......	......
8120	14	Pacific Coast.	......	Young.
8121	..	"	......	......
8460	..	Columbia River, Or.	Com. Wilkes.	Animal in alcohol.
8498	2	....	J. G. Anthony.	Cabinet ser.
8575	4	Columbia River, Or.	Com. Wilkes?	" W. C.
9119	1	Washington Territory	"	Fig. 193.

Planorbis trivolvis, Say.—Shell sinistral, pale yellow, brownish or chestnut color, subcarinate above and beneath, particularly in the young shell; whirls three or four, striate across with fine, raised, equidistant, acute lines, forming grooves between them. Spire concave; aperture large, embracing a considerable portion of the body whirl, within bluish-white; lip a little thickened internally, and of a red or brownish color, vaulted above; umbilicus large, exhibiting the volutions. Length one-fourth of an inch; breadth one-half of an inch. Animal aquatic, dark ferruginous, with very numerous, confluent, pale yellowish points; tentacula long, setaceous, with confluent points; foramen on the left side.

Fig. 194.



Planorbis trivolvis.

That ingenious naturalist, Mr. C. A. Lesueur, found this species of a much larger size in French Creek, near Lake Erie; breadth three-fourths of an inch nearly; color almost black, purplish-red within the mouth.

Lister (*Cochlea trium orbium*, Lister, Conoh. tab. cxl, f. 46) figures this shell pretty accurately, and it is referred to in Gmelin's edit. of Syst. Nat. p. 3615, as *albella*, but it is certainly not that species. (Petiver, Gazophyl. pl. cvi, f. 17.)

This is an inhabitant of the Middle and Northern States, and is very common in many districts. I have found it in Pennsylvania, New Jersey, Delaware, Maryland, Falls of Niagara, Upper Canada, and in the vicinity of Council Bluff on the Missouri. Dr. Eights sent me specimens from Albany, New York, and Mr. Jessup gave several from Cayuga Lake. Lister gives two pretty good figures of this shell, and quotes Virginia as the native locality. Muller, Gmelin, and Dillwyn incorrectly referred to Lister's figures as *Helix albella*; but the latter author, in his edition of Listor, agrees with us in considering them as representations of the present species. (*Say.*)

Planorbis trivolvis, SAY, Nich. Ency. pl. ii, f. 2 (1817, 1818, 1819); Am. Conch. pt. 6, pl. liv, f. 2 (1834): BINNEY's ed. p. 44, pl. lxx, f. 2; pl. liv, f. 2.—DEKAY, N. Y. Moll. 59, pl. iv, f. 59, *a*, *b* (1843).—GOULD, Inv. of Mass. 201, f. 131 (1841).—HALDEMAN, Mon. 13, pl. ii, f. 4-7 (1844).—ADAMS, Shells of Vt. 154 (1842).—KÜSTER in CHEMN. ed. 2, p. 53, pl. v, f. 4-6; pl. vi, f. 1-6, 20-25.—POTIEZ et MICHAUD, Gal. des Moll. I, 214, pl. xxi, f. 19-21.—ANON. Can. Nat. II, 202, fig. (1857).

Bulla fluviatilis, SAY, Jour. Acad. Nat. Sc. II, 178: ed. BINN. 71.

Planorbis regularis, LEA, Tr. Am. Phil. Soc. IX, 6; Proc. II, 32 (1841); Obs. IV, 6.

Planorbis megastoma, DEKAY, N. Y. Moll. 61, pl. iv, f. 60, 61 (1843).

Physa planorbula, DEKAY, N. Y. Moll. 76, pl. v, f. 83 (1843).

Planorbis corpulentus, DEKAY, N. Y. Moll. 64, pl. xiii, f. 185 (1843).—WHITTEMORE, Am. Journ Sc. [1], XXXVIII, 193.

?*Planorbis proboscideus*, POTIEZ & MICHAUD, Gal. des Moll. I, 213, pl. xxv, f. 13-15 (1838).

Planorbis macrostomus, WHITEAVES, Can. Nat. VIII, 113, fig. (1863).

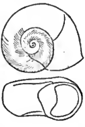
Planorbis trivolvis, var. *fallax*, HALDEMAN, Mon. 15, pl. iii, f. 1–3 (1844).
Planorbis lentus, GOULD, Inv. 202, f. 132 (1841).
Helix trivolvis, EATON, Zool. Text-Book, 194 (1826).
Cochlea trium orbum, LISTER, Conch. pl. cxl, f. 46.—PETIVER, Gazophyl. pl. cvi, f. 16.

This species probably inhabits all of the United States and Canada. It has been found at Fort Simpson, to the Red River of Louisiana, from Puget Sound to San Diego, in Utah, and from New England through the Western and Middle States. Poey catalogues it among the Cuban shells.

Fig. 195 is a better representation of the species than the fac-simile of Mr. Say's figure given in Fig. 194.

I give below the original descriptions of the synonyms of this species. Of these *Physa planorbula*, *Bulla fluviatilis*, and *Planorbis regularis* are immature forms. *Plan. megastoma* and *Plan. macrostomus* are an overgrown form or monstrosity. All the following figures are fac-similes excepting Fig. 196, which was drawn from the original specimen of Mr. Lea.

Fig. 195.



Planorbis trivolvis.

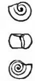
Haldeman quotes *Pl. regularis* as a synonym, and Adams *Pl. lentus* and *corpulentus*.

Planorbis regularis, LEA.—Shell subglobose, above nearly flat, beneath narrow, umbilicate, pellucid, pale yellow, obsoletely striate; whirls three, above carinate; lip acute, margined, within thickened; aperture ovate.

Hab. United States. My cabinet, and cabinet of P. H. Nicklin. Diam. .30, length .20 of an inch.

I have unfortunately mislaid the label which accompanied the shells from which the above descriptions were made. My impression is that they came from one of the Western States. All the specimens before me are very much alike in size and form—being exceedingly regular. The striæ are more perceptible around the umbilicus and on the spire. On the side they are so much obliterated as to permit the whirl to present a shining appearance. The carina is very sharp and well defined. It has very much the appearance of a young *trivolvis*, Say, and may possibly be only a variety of that species. (*Lea.*)

Fig. 196.



Planorbis regularis.

Bulla fluviatilis, SAY.—Shell suboval, pellucid, pale yellowish-white finely wrinkled; volutions three; body whirl large, with a prominently carinated shoulder bounding the spire; spire perfectly flat or slightly concave, giving to the shell a perfectly truncated appearance in that part; aperture longer than the columella, oblong-ovate, extending beyond the tip of the spire; umbilicus profound, edged by a slight carina. Length of the aperture one-fifth of an inch; greatest breadth somewhat less.

Inhabits the river Delaware. This species seems to be rather rare; it was discovered by Mr. Aaron Stone, deeply imbedded in the mud. Mr. William Hyde, of this city, has since found specimens of it amongst some dead shells of other genera assembled in a small inlet of the river. (*Say.*)

Physa planorbula, DEKAY.—Shell small, thin and fragile, sinistral, cylindrical above, tapering beneath, abruptly truncated on the summit; apex very slightly elevated above the truncation. Whirls four, the surface smooth, with minute revolving lines crossed by others equally minute. Body whirl with an acute shoulder, the edge being slightly turned over. Aperture as long as the shell, narrow above, dilated beneath, and broadly rounded. Outer lip acute, thin and reflected over the enlarged umbilicus. Color light amber. Length 0.2 inch.

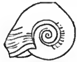
Fig. 197.

Physa planorbula.

This singular shell was found by Mr. G. B. Clendining at the Cohoes Falls, adhering to stones. I have adopted the name proposed by its discoverer. It was alive, and was destitute of an opercule. It is supposed by some conchologists to be a young *Planorbis*, but I cannot learn that it has been found in the intermediate stages. It is placed provisionally here; but if a perfect animal, must constitute a new genus. I am inclined to suspect that it is the animal described by Say as *Bulla fluviatilis.* (*DeKay.*)

Planorbis megastoma, DEKAY.—Shell large, coarse and solid. Whirls nearly five, rounded, with coarse transverse waving wrinkles, becoming larger towards the mouth. A large prominence on the body whirl nearly opposite to the aperture, producing an obtuse angle. Spire depressed, with the suture distinct; beneath, the volutions are exhibited nearly to the apex. Mouth dilated, but somewhat contracted at the margin, 0.3 inch wide and 0.4 high; its lower portion rounded, arising from the lower part of the penultimate whirl; line of the upper margin more nearly straight. In the young, the aperture is not so much dilated, and is obscurely trigonal, with the lower margin beneath the plane of the transverse diameter of the shell. Color olivaceous, tinged with yellowish within the aperture. In the young, black, with the interior of the aperture dull reddish. Diameter 0.8, height 0.3 inch.

Fig. 198.

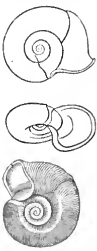


Planorbis megastoma.

This *Planorbis* was found near Lake Ontario, and appears to be different from any species yet described. In its aperture it resembles the small *P. dilatatus* of Gould, but is otherwise very distinct. (*DeKay.*)

Planorbis macrostomus.—Shell in many points closely resembling *P* *lentus*, Say, of which perhaps it may only be a variety. It is much larger, higher, and has deeper costæ; its lines of growth are very prominently marked; the upper angle of the whirls, as shown in the mouth, is more prominent. Lip widely expanded, and reflected, covered with a white enamel. In this latter character it differs from all the American species of *Planorbis*. It is a species nearly allied to *Planorbis lentus* and *P. trivolvis;* but apparently distinct from both. (*Whiteaves.*)

Fig. 199.



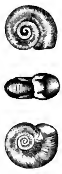
Planorbis macrostomus.

I am inclined to believe *Pl. proboscideus* to be identical with *Pl. trivolvis.* The figure of Potiez & Michaud, copied below, represents a more flattened shell than usually found in *trivolvis*, and the whirls are more numerous. The original description also is given below.

Planorbis proboscideus (MKE., teste ZIEGLER).—This shell has a slight resemblance in form to a young *Pl. corneus*, but it has strong longitudinal striæ; the six whirls are carinated towards the two umbilici, and rounded at the periphery; the upper umbilicus is deep, as well as the lower, which is also large; the aperture is subtrigonal and irregular, which is caused by a depression below. Diam. 20 mill., height 10 mill.

North America in Ohio. (*Potiez & Michaud.*)

Fig. 200.



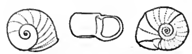
Planorbis proboscideus.

A copy of Prof. Haldeman's description and figure of *Pl. trivolvis*, var. *fallax*, now follow.

Planorbis trivolvis, var. *fallax.*—*Animal* dark brown, minutely dotted with ochre-yellow, upon the parts which are usually exposed; tentacles very long, colored like the body, except that the tint is somewhat lighter near the base; foot posterior to the neck, about equal in length to the head in front of the tentacles.

Shell thin in texture, translucent, and transversely striate; two and a half turns are visible above, the remaining ones disappearing in the narrow umbilic; lower side carinated, having a wide, shallow cup, as

Fig. 201.



Planorbis trivolvis, var. *fallax*.

in figure 9, when the left posterior angle of the aperture advances along the carina; but the symmetry of the cup disappears, when the inner portion of the last whirl revolves to the right of the carina, as in figure 3; in this case, the right margin of the aperture is nearly level with this side of the shell, but it is frequently thrown below, or to the left of it, when it bears some resemblance to figure 5: aperture slightly compressed anteriorly, the left margin extending beyond the plane of the shell. Color light brown, sometimes greenish.

Massachusetts, Lake Erie, Indiana?

Monstrosity: Posterior extremity of the foot divided.

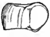
In color and consistency, the ova resemble those of *P. bicarinatus*. Dr. Gould has expressed an opinion, that if this be not *P. lentus*, it must be an uncharacterized species. He remarks that it is "a darker shell than *P. trivolvis*, and is distinguished from it by its left side and its aperture. The cup of the left side is less smooth and regular, and is not bounded by the sharp, elevated line; when this shell is laid upon its right or upper side, the lip of that side will scarcely touch the plane on which it lies; while, in *P. trivolvis*, the shell would be lifted by the lip; the aperture has not the sharp angle of the left side produced by the termination of the carina, but in the young stages it is difficult to distinguish the two."

Professor Adams remarks that "*P. lentus*, *P. corpulentus*, and *P. trivolvis*, of Say, are undoubtedly varieties of one species;" but he sent me large specimens of *P. trivolvis* (pl. 2, fig. 6) as *P. corpulentus*; and believed the shell now under consideration to belong to *P. lentus*. I have figured it upon the same plate with the latter, to afford a ready comparison between them; and have thought best to describe it at large, under a distinct heading. I have seen it living in the vicinity of Boston, but have examined so small a number of individuals, that I do not feel myself competent to make a final decision between two authors whose location gives them facilities which I do not enjoy. (*Haldeman.*)

Cat. No	No. of Sp.	Locality.	From whom received.	Remarks
8115	14	Pacific Coast.	......	......
3253	5	San Diego, Cal.	P. R. R.	......
8124	9	Mohawk, N. Y.	Dr. J. Lewis.	Local var.
8125	15	Yellowstone River.	......	......
8126	9	St. Clair River.	......	Strongly ribbed
8127	17	Newport, R. I.	W. G. Binney.	......
8128	15	Utah.	Capt. J. H. Simpson.	......
8129	3	Madison, Wis.	Prof. S. F. Baird.	......
8130	3	Farwell's Mills, 3 mile Creek, Oswego, N. Y.	Dr. J. Lewis?	......
8131	5	Toledo, O.	T. A. Bossard.	......
8132	5	Ruby Valley.	Capt. J. H. Simpson.	......
8133	6	Grand Coteau, La.	......	......
8144	16	....	......	Young.
8145	3	20 m. w. of Choctaw, Ar	Lt. A. W. Whipple.	......
8146	8	Cape Elizabeth, Me.	Dr. J. Lewis.	Local var.?
8147	7	Port Huron, Mich.	Prof. S. F. Baird.	......
8148	15	Lake Winnipeg. [town.	R. Kennicott.	......
8149	3	Little R., near Shawnee-	......	......
8150	13	Mohawk, N. Y.	Dr. J. Lewis.	......
8151	1	Between Pike Lake and Fort Union	Gov. J. J. Stevens.	......
8152	2	Rud's Lake, Mich.	......	......
8153	6	Goose Island, Mich.	......	......
8154	4	Michigan.	W. G. Binney	......
8155	2	Illinois. [Min	......	......
8156	5	Lake Como, St. Pauls,	S. B.	......
8157	4	Prairie Lakes, n. Red R.	R. Kennicott.	......
8158	16	Southern Illinois.	"	......
8159	5	Grindstone Creek.	......	......
8160	12	Ruby Valley?	Capt. J. H. Simpson.	..... [Griffith.
8161	2	Delaware River.	W. G. Binney.	Labelled by Dr. R. E.
8162	8	Apple Creek, lat. 47°.	......	......
8163	7	New York.	Dr. J. Lewis.	......
8164	1	Big Sioux.	......	......
8165	25	Columbus, Ohio.	Dr. J. Lewis.	......
3723	2	30 m. w. of Ft. Kearney.	......	......
8166	2	Centre County, Pa.	......	......
8167	9	....	......	Young.
8168	4	Milwaukee Wis.	I. A. Lapham.	"
8169	9	Marietta, O.	W. Holden.	......
8170	4	Milwaukee, Wis.	I. A. Lapham.	......
8171	8	Texas.	......	......
8200	5	Milwaukee, Wis.	I. A. Lapham.	......
8448	12	Chileneyuck Depot, Puget Sound.	A. Campbell.	Animal in alcohol.
8475	3	Madison, Wis.	Prof. Baird.	Cabinet series.
4399	6	Pacific Coast.	......	"
4426	8	San Francisco.	......	"
8731	5	"	Rowell.	......
8952	1	Fort Simpson, Br. Am.	R. Kennicott.	......
8173	8	Fort Union.	......	Var. *fallax*.
8505	2	....	W. G. Binney.	" Cab. ser.
8971	..	Fort Resolution.	Kennicott.	......
9062	100+	Grand Rapids, Mich.	Dr. J. Lewis.	......
9064	50+	Hudson's Bay.	Drexler.	......
9069	20+	Fort Simpson	Kennicott.	......
9110	20+	Mohawk, N. Y.	Dr. Lewis.	......
9112	50+	"	"	......
9115	3	Fort Vancouver.	Cooper.	......
9120	1	California.	"	......
9272	10	Isle la Crosse.	Kennicott.	......
9275	5	Great Slave Lake.	"	......
9257	50+	Massachusetts.	Stimpson.	......
9259	8	Wright's Lake, Cal.	Newberry.	......

Planorbis truncatus, Miles.—Shell suborbicular, color light chestnut; the right side deeply umbilicated, the concavity bordered by an obtuse carina; the volutions seen from this side are scarcely more than two; left side truncated, presenting a flat surface extending across all the whirls, the suture being marked by a minute raised line, which likewise extends around the edge of the truncation; the space between the volutions of this raised line, as well as the entire body of the shell, is beautifully marked with delicate longitudinal lines, which are crossed by the minute, raised, transverse lines of growth; whirls on left side four or five; aperture ovate, widest on the right side, which extends beyond the general plane of that side of the shell; the lip on the left side is straight for a short distance from the body whirl, and to a line with the truncated plane, at the outer edge of which it forms an angle, marked on the inner surface by a slight groove, corresponding in the raised line separating the whirls on the outside; lip thin, slightly thickened by a bluish white callus, bordered on the inner edge by a purplish band; the longitudinal lines, as well as the transverse lines of growth, are distinctly seen within the aperture. Measurements, 6—35.

Fig. 202.



Planorbis truncatus.

Hab. Saginaw Bay.

In a few specimens the growth of the whirls has not been in the same plane, leaving a slightly projecting turreted spire on the left side. (*Miles.*)

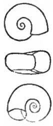
Planorbis truncatus, Miles in Winchel's Geol. Surv. Michigan, 1861, p. 238.

Fig. 202 is drawn from No. 9010 of the collection, furnished by Prof. Miles, whose description is given above.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9010	1	Michigan.	Prof. Miles.	Fig. 202. Type.

Planorbis fragilis, Dunker.—Shell tumid, fragile, very delicately striate, pale horn or amber colored; deeply umbilicate above, below rather concave; whirls four, involute, on each side rounded, rapidly increasing; the upper ones spirally striated and decussated, conspicuous below; aperture large, spreading, oblique, kidney-shaped; lip very acute, with a very delicate, white callus on the parietal wall.

Fig. 203.



Planorbis fragilis.

Shell very ventricose, very thin and fragile, delicately striated, pale horn or amber colored; above very deeply umbilicated, with the apex hardly visible; below, slightly concave. Whirls four, rounded, strongly involute and rapidly increasing, the last with microscopic striæ; aperture oblique, wide, kidney-shaped; on the parietal wall is a delicate callus connecting the termini of the peritreme. Greatest diam. .6, height at aperture 3⅓ lines.

Hab. Near Mexico, with *P. tenuis*, which is, however, a rarer species: David & Herr Geb. M. R. Dr. N. Meyer. (*Küster.*)

Planorbis fragilis, DUNKER in CH. ed. 2, p. 46, pl. viii, f. 41–43.

I have given above a copy of the description and figure of this species.

Planorbis lautus, H. ADAMS.—Shell subovate, thin, the height equalling the width, yellowish-white, deeply and narrowly umbilicated above, flat below; whirls three, rapidly increasing, rounded, angulated and contracted above, carinated below, decussated by fine striæ; aperture slightly oblique, subovate, extending above the penultimate whirl, peritreme continuous. Diam. 2 lin.

Hab. New Orleans. (*H. Adams.*)

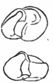
Planorbis (*Helisoma*) *lautus*, H. ADAMS, Proc. Zool. Soc. London, 1861, p. 145.

I have not seen this species, of which the original description is given above.

Planorbis bicarinatus, SAY.—Shell sinistral, pale yellow or brownish, subcarinate above, and beneath translucent. Spire retus-umbilicate, forming a cavity as deep as that of the base. Aperture large, embracing a considerable portion of the body whirl, and much vaulted above. Within red brown, with two white lines corresponding with the carina. Whirls three, wrinkled and with minute revolving lines. Length one-fourth of an inch, breadth nearly half an inch.

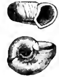
Inhabitant aquatic, ferruginous, with numerous yellowish dots; tentacula dotted and flexuous. Pl. 1, fig. 4. Resembles the preceding species in its outline, but differs from that shell in the remarkable appearance of its spire; it is also destitute of those fine parallel raised lines, and is furnished with minute striæ, never visible in *P. trivolvis*: the superior part of the lip is more vaulted, and the carina more visible. (*Say.*)

Fig. 204.



Planorbis bicarinatus.

Fig. 205.



Planorbis bicarinatus.

Planorbis bicarinatus, SAY, Nich. Ency. pl. i, f. 4 (1817, 1818, 1819); Am. Conch. 6, pl. liv, f. 3 (1834): BINNEY's ed. 44, pl. liv, f. 3; pl. lxix, f. 4.—MRS. GRAY, Fig. Moll. An. pl. cccx, f. 1.—HALDEMAN, Mon. vii, p. 6, pl. i, f. 1–6 (1844).—ADAMS, Shells of Vt. 155 (1842).—DEKAY, N. Y. Moll. 60, pl. iv, f. 63 (1843).—GOULD, Inv. of Mass. 203, f. 134 (1841).—CHEMN. ed. 2, p. 56, pl. ix, f. 11–13.—POTIEZ et MICHAUD, Gal. des Moll. 1, 207, pl. xxi, f. 1–3.—ANON. Can. Nat. II, 204, fig. (1857).

Helix angulata, RACKETT, Lin. Tr. XIII, p. 42, pl. v, f. 1 (1822).—WOOD, Cat. Suppl. pl. vii, f. 12: HANLEY's ed. p. 226.

Helix bicarinatus, EATON, Zool. Text-Book, 194 (1826).

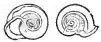
Planorbis engonatus, CONRAD, N. Fresh Sh. Suppl. p. 8, pl. ix, f. 8 (1834). —LISTER, 139–44?

The species ranges from the British Possessions to Kansas and Georgia.

It must not be confounded with *Planorbis bicarinatus* of Lamarck, An. sans Vert. vol. 7, Aug. 1822.

Fig. 204 is a fac-simile of that of Say, and Figs. 206 and 207 of those of Rackett and Conrad. Haldeman, who saw the original specimen of the latter declares it to be a monstrosity of *Plan. bicarinatus*. The original descriptions are also given below.

Fig. 206.



Helix angulata.

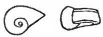
Helix angulata, RACKETT (*l. c.*).—Shell imperforate, concave on both sides; first whirl angulated on both sides.

Hab. Near Lake Huron. Diam. ½ inch.

Transversely striate, pale yellow; three to four contiguous whirls; aperture large, rimmed. (*Rackett.*)

Planorbis engonatus, CONRAD.—Shell yellowish, triangulated above, spire not profoundly impressed, side of the body whirl flattened, and both margins carinated; aperture longitudinally subovate, slightly campanulate.

Fig. 207.



Planorbis engonatus.

This species was found at Albany, N. Y., by Mr. Alva Mason. It differs from all other species of the United States in the flattened form of its lateral or outer margin. (*Conrad.*)

Planorbis bicarinatus of Sowerby's Genera of Shells appears rather to be identical with *Pl. campanulatus*.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8212	20	Cherry Creek.	......	......
8213	15	Mohawk River, N. Y.	Dr. J. Lewis.	......
8214	11	Northern Georgia.	A. Gerhardt.	......
8215	5	Milwaukee, Wis.	I. A. Lapham.	......
8216	11	Big Sioux.	......	......
8217	4	Yellowstone.	......	......
8218	10	Little Lakes, N. Y.	Dr. J. Lewis.	......
8219	3	Herkimer County, N. Y.	"	......
8220	5	Big Cr., Centre Co., Pa.	......	......
8221	6	New York?	Dr. J. Lewis.	......
8222	2	Illinois.	......	......
8403	3	New York.	Dr. J. Lewis.	Cabinet series.
9111	50+	Mohawk, N. Y.	"	......
9113	50+	"	"	......
9262	15	Virginia.	Dr. English.	......

Planorbis antrosus, CONRAD.—Shell dextral, not depressed; whirls three; spire profoundly indented or concave, with the summit of the body whirl angular; inner volutions angulated, umbilicus profound, with the margin and inner volutions angulated; body whirl abruptly dilated near the aperture; aperture longitudinally subovate, dilated.

Randon's Creek, near Claiborne, Alabama, adhering to limestone rocks. (*Conrad.*)

Planorbis antrosus, CONRAD, Am. Journ. Sc. [1], XXV, No. 2, p. 343 (1834).—DEKAY, N. Y. Moll. 66 (1843).—MÜLLER, Syn. Test. 1834 prom. p. 34 (1836).

I have seen no authentic specimen of this shell.

SUBGENUS **MENETUS**, H. & A. AD.

Shell depressed; whirls rapidly increasing, periphery angulated.

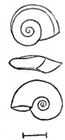
Moquin-Tandon uses *Hippeutis* of Agassiz instead of *Menetus* as a name for this section. I do not have access to the description of *Hippeutis*, and therefore follow H. & A. Adams in using *Menetus*.

Planorbis opercularis, GOULD.—Shell small, dextral, much depressed, lenticular, with a prominent blunted keel at the periphery defined by a marginal, compressed line; tip sunken; beneath umbilicated for about one-third the breadth of the base, showing three volutions, convex, surface rather rude and indented, marked with irregular, coarse, much arcuated lines of growth, and here and there a few obscure, raised, revolving lines; color dark chestnut-brown, a little clouded; whirls above four, slightly convex; suture well defined, impressed; aperture transversely sub-rhombic, lip above slightly declining, at periphery acute-angled, beneath arched, lips embracing three-fourths of that part of the whirl which is beneath the carina. Length one-fourth, diam. one-sixteenth inch.

Sacramento River, California.

Allied to *Pl. exacutus*, but is larger, less compressed and less delicate, and the periphery instead of being sharp-edged, has a blunted keel like *Pl. carinatus.* (*Gould.*)

Fig. 208.



Planorbis opercularis.

Planorbis opercularis, GOULD, Proc. Bost. Soc. Nat. Hist. II, 212 (1847); U. S. Ex. Ex. Moll. 113, f. 132, 132 *a*, 132 *b* (1852); Otia, 42.

Planorbis planulatus, Cooper, Report on the Nat. Hist., &c., of Washington Terr., &c., p. 378 (1859); P. R. R. Rep. XII, 378.

Dr. Gould's description and figures are given above. There can be no doubt of the identity of Cooper's species with it. The Fig. 209 is drawn from a shell furnished by Judge Cooper, who also has enabled me to examine all the shells collected by Dr. Cooper.

Fig. 209.

Planorbis planulatus.

Planorbis planulatus, Cooper.—A small carinated species, flat above, convex below, having much the appearance of a *Valvata*, found only in Lakes on Whidby's Island at the entrance of Puget Sound. (*Cooper.*)

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
4280	4	San Francisco.	Com. Wilkes.	Cabinet series.
8718	4	"	Rowell.	[(*planulatus*).
9118	3	Whidby's Island.	Judge Cooper.	Type. Fig. 209

Planorbis exacutus, Say.—Dextral, depressed, with an acute edge. Inhabits Lake Champlain. Cabinet of the Academy.

Shell depressed; whirls four, striated across, wider than long, not elevated above the suture, but a little flattened, sides obliquely descending to an acute lateral edge, below the middle; spire not impressed; suture not profoundly indented; beneath, body whirl flattened, on the inner edge rounded; umbilicus regular, exhibiting all the volutions to the apex; aperture transversely sub-triangular; labrum angulated in the middle, arcuated near its inferior tip, the superior termination just including the acute edge of the penultimate whirl. Greatest breadth rather less than ¼ of an inch.

Fig. 210.

Planorbis exacutus.

This species was found in Lake Champlain by Mr. Augustus Jessup, who deposited it in the collection of the Academy. Only two specimens occurred. It may be readily distinguished from *P. parvus*, by its more convex form above, the spire not being impressed, and by its very acute lateral edge. It appears to be pretty closely allied to *Planorbis nitidus* of Europe, but it is larger, the umbilicus much more dilated, and the aperture does not embrace the penultimate whirl so profoundly. (*Say.*)

Planorbis exacutus, Say, Jour. Acad. Nat. Sc. II, 165 (1821): Binney's ed. 64.—Haldeman, Mon. 21, pl. iv, f. 1–3 (1844).—Gould, Inv. of Mass. 208, f. 137 (1841).—Adams, Shells of Vt. 155 (1842).—DeKay, N. Y. Moll. 63, pl. iv, f. 62 *a*, *b* (1843).—Anon. Can. Nat. II, 207, fig. (1857).

Planorbis lens, Lea, Tr. Am. Phil. Soc. VI, 68, pl. xxiii, f. 83; Obs. II, 68 (1839).

Planorbis brogniartiana, Lea, Tr. Am. Phil. Soc. IX, 24; Obs. IV, 24 (1844); Pr. II, 242 (1842).

Planorbis lenticularis, Lea, Tr. Am. Phil. Soc. IX, 6; Obs. IV, 6 (1844).

Planorbis buchanensis, Lea, Tr. Am. Phil. Soc. IX, 6 (1844); Pr. II, 32 (1841); Obs. IV, 6.

Paludina hyalina, Lea, Tr. Am. Phil. Soc. VI, 17, pl. xxiii, f. 81; Obs. II, 17 (1839).

The species has been quoted from New England to Kansas and the District of Columbia.

The single individual from which Mr. Lea drew his description of *Paludina hyalina* has been lost. I have not seen it. The following copy of the original description and figure will at once convince the reader of its being a distorted specimen of *Planorbis exacutus*.

Paludina hyalina, Lea.—Shell obtusely conical, carinate, diaphanous, flattened below; whirls four; sutures very much impressed; aperture widely rounded. Diam. .2, length .2 inch nearly.

Near Poland, Ohio: Dr. Kirtland. Cabinet of Mr. Hyde.

Dr. Kirtland sent the only specimen of this shell I have seen to Mr. Hyde, under the impression that it was a deformed specimen of *Planorbis*. Mr. Hyde communicated it to me as a new species, of which there cannot, I think, be a doubt. It is very remarkable for the flatness of the inferior portion of the last whirl, and for the carina on the periphery which this causes. It is perhaps thinner and more transparent than any species yet described. (*Lea.*)

Fig. 211.

Paludina hyalina.

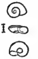
Planorbis buchanensis, Lea, is evidently synonymous with *P. exacutus*. The original description and figures from Mr. Lea's type now follow:—

Planorbis buchanensis, Lea.—Shell sub-lenticular, above sub-convex, carinate at the periphery, beneath narrow umbilicate, horn-color or brownish, smooth; whirls three; lip sharp; aperture rounded.

Hab. Near Cincinnati, Ohio; R. Buchanan. My cabinet, and cabinets of T. G. Lea and R. Buchanan. Diam. .12, length .08 of an inch.

Several specimens of this species were sent to me several years since by my brother T. G. Lea, who informed me that they were first observed by Mr. Buchanan, after whom I name it. This species is very nearly allied to *P. lens*, Nobis, but it may at once be distinguished by its round aperture, which is somewhat spread out. The aperture of the *lens* (now *lenticularis*), is *triangular*, and the size of the shell rather larger. (*Lea.*)

Fig. 212.



Planorbis buchanensis.

Planorbis lens is referred doubtfully to *exacutus* by DeKay. Gould refers it to *P dilatatus*. I have no hesitation in placing it in the synonymy of *Pl. exacutus*. No. 8508 of the collection was labelled *P. lens* by Mr. Lea. A copy of his description and figure here follow. The names *P. lenticularis* and *P. brogniartiana* were suggested by Mr. Lea in place of the pre-occupied name first published by him.

Planorbis lens, Lea.—Shell small, lenticular, widely umbilicate, carinate on the periphery, peilnoid, horn-colored; whirls three; aperture large.

Fig. 213.

Planorbis lens.

Hab. Near Cincinnati, Ohio: R. Buchanan. My cabinet, and cabinets of R. Buchanan and T. G. Lea. Diam. 3-20ths, length 1-20th of an inch.

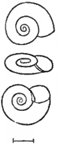
This is the smallest of the *Planorbes* which has come under my notice, and may at once be distinguished by its lenticular form. The specimens in my possession I owe to my brother T. G. Lea. They were first pointed out to him by Mr. Buchanan. (*Lea.*)

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8203	2	Ohio.	S. M. Luther.	......
8209	12	Marietta, Ohio.	W. Holden.	......
8210	2	Milwaukee, Wis.	I. A. Lapham.	......
8211	10	Ann Arbor, Mich.	W. G. Binney.	......
8494	2	....	"	Cabinet series. [Lea.
8508	3	Yellowstone River.	Dr. F. V. Hayden.	Marked *Pl. lens* by I.
92[illegible]2	1	....	......	(*lens*, teste Lea.)

Subgenus **GYRAULUS**, Agassiz.

Shell orbicular above, flat beneath; whirls few, rapidly increasing.

Fig. 214.



Planorbis vermicularis.

H. & A. Adams use *Nautilina*, Stein, as a name for this section, but Moquin-Tandon uses Agassiz' name. I am unable to decide which should have preference.

Planorbis vermicularis, Gould.—Shell small, dome-shaped, minutely striated by growth, white (probably bleached by the liquor from which it was taken); whirls four, breadth and height about equal, the last one deflected near the aperture, rounded at periphery, tip depressed, suture very deep, the whirls sloping towards it; base cup-shaped, exhibiting all the whirls. Aperture exhibiting a very oblique section of a cylinder; lip embracing about one-half the height of the last whirl and joined by callus. Diam. one-fifth, height one-fifteenth inch.

Interior of Oregon: Drayton.

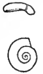
It is about the size of *Plan. deflectus*, Say, but is less depressed, the whirls more cylindrical, not carinated at periphery. (*Gould.*)

Planorbis vermicularis, Gould, Proc. Bost. Soc. Nat. Hist. II, 212 (1847); U. S. Ex. Ex. Moll. p. 112, f. 131, 131 *a*, 131 *b* (1852); Otia, 42.

I have seen no specimens of this species. The original descriptions and figures are given above.

Planorbis deflectus, Say. — Shell dextral, depressed; whirls nearly five, minutely and regularly wrinkled across, wider than long with a much depressed rotundity above, descending to an acute lateral edge below the middle; spire not impressed; suture indented, but not profoundly; beneath a little concave in the middle, exhibiting one-half of each volution to the apex; whirls flattened, slightly rounded; aperture declining very much, suboval, the superior portion of the labrum considerably surpassing the inferior portion, and taking its origin a little above the carina; inferior portion of the labrum terminating on the middle of the inferior surface of the penultimate whirl. Greatest breadth two-fifths of an inch.

Fig. 215.



Planorbis deflectus.

This shell was presented to me by Dr. Bigsby, who collected many specimens in the waters of the Northwest Territory. It resembles the *exacutus*, Nob., but the aperture does not embrace so large a portion of the preceding volution, and the volutions on the inferior portions of the shell are consequently more obvious and the umbilicus is but slightly indented; the upper portion of the labrum does not extend so far beyond the lower portion, the aperture declines much more, and the carina is less acute. It has also an affinity for the *carinatus* of Europe, but in addition to other differences, the aperture of that species declines but little, if at all, and the carina is an elevated revolving line. The aperture embraces the penultimate volution about as much as in the *rotundatus* of Europe, to which our shell is also allied, but differs in its declining aperture, and the less degree of rotundity of its whirls on their upper surface. (*Say.*)

Planorbis deflectus, Say, Long's Ex. II, 261, pl. xv, f. 8 (1824): Binney's ed. p. 128, pl. lxxiv, f. 8.—Haldeman, Mon. 25, pl. iv, f. 4–7 (1844).—Gould, Invert. 207, f. 136 (1841).—Adams, Shells of Vt. 156 (1842).—DeKay, N. Y. Moll. 65 (1843).—Anon. Can. Nat. II, 206, fig. (1857).

Planorbis virens, Adams, Am. Journ. Sc. [1], XXXIX, p. 274 (1840); Bost. Journ. III, 326, pl. iii, f. 15 (1840).—DeKay, N. Y. Moll, 66 (1843).

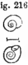
Planorbis obliquus, DEKAY, N. Y. Moll. 62, pl. iv, f. 57 *a*, *b* (1843).
Nautilina deflecta, CHENU, Man. de Conch. II, 482, f. 3566.

This species is said to range from great Slave Lake to the District of Columbia, and from New England to Nebraska.

Mr. Say's type is still preserved in the Philadelphia Academy.

I am inclined to place *P. obliquus* in the synonymy of *P. deflectus*. *Pl. virens* is so considered by both Gould and Haldeman. Copies of the original descriptions and figures here follow:—

Fig. 216.



Planorbis virens.

Planorbis virens.—Shell small, greenish horn-color, with thick, obvious striæ of growth, and very slight revolving lines, with a green rough epidermis; whirls four; suture impressed; spire not rising above the last whirl, but scarcely falling below it; last whirl much larger than the spire, flattened above, then abruptly curving downwards (in the young shell, at the upper third of the last whirl, is a carina, which is gradually modified into the abrupt curvature, in the progress of growth), subcarinate below, as are also the preceding whirls; aperture nearly orbicular, interrupted by the last whirl in about one-fifth of its circumference, advancing above; umbilicus as broad as the last whirl, rather deep, exhibiting all the volutions. Height (of the last whirl) .09 inch, greatest breadth .23 inch, least breadth .18 inch. Cabinets of the Bost. Soc. Nat. Hist., of Middlebury College, of Mr. Shiverick, and my own.

Habitat. New Bedford.

For this species I am indebted to Mr. Shiverick. It differs from *P. parvus*, Say, in being much less broadly and more deeply umbilicate beneath; it is also higher. *P. parvus*, also, instead of being subcarinate on the lower side of the whirls is much flattened. *P. concavus*, Anthony MSS., resembles this species, but is more regularly convex above and concave beneath. (*Adams.*)

Fig. 217.

Planorbis obliquus.

Planorbis obliquus, DEKAY.—Shell depressed, discoidal. Volutions four; the surface shining, with regular minute incremental lines; the body whirl obsoletely subangular below. Spire nearly as much depressed as the umbilicus, which latter is large and exhibits all the volutions to the apex; suture distinct; body whirl not distinctly deflected from the plane of the other volutions. Mouth unarmed, very oblique. Color dull olive. Diameter 0.3, height 0.1.

The specimens of this species were obtained from the Mohawk and from Newcomb's Pond, in Pittstown, and presented by Dr. B. W. Budd, of this city. Some eminent conchologists suppose it to be a variety of the *deflectus* of Say; but from this it differs by the obliquity of the mouth when turned downwards, and has no acute lateral edge as in that species. The *concavus* of Anthony, of which I have seen specimens, but no description, may possibly be the young of this, but at all events is a closely allied species. (*DeKay.*)

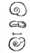
Planorbis deformis, Lam., figured in Delessert's Recueil, very much resembles this species in the characteristic deflection of the last whirl at the aperture.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8190	19	Milwaukee, Wis.	I. A. Lapham.	......
8191	14	Loup Fork.	......	......
8192	1	Lake of the Woods.	R. Kennicott.	......
8193	12	Washington, D. C.	......	......
8194	8	Ann Arbor, Mich.	......	......
8[illegible]01	5	Wisconsin.	I. A. Lapham.	Cabinet series.
9273	8	Great Slave Lake.	R. Kennicott.	......

Planorbis dilatatus, Gould.—Shell small, circumference carinated, flat above, convex below, and with a small, deep umbilicus; whirls three; aperture large, expanded.

State Coll. No. 75, Soc. Cab. No. 2399.

Fig. 218.



Planorbis dilatatus.

Shell small, of a yellowish-green color, minutely wrinkled by the lines of growth; spire flat, composed of not more than three whirls, separated by a well-defined suture; the outer whirl has a sharp margin on a level with the spire, diminishing near, but still modifying, the aperture; below this line, the whirl is very convexly rounded so as to encircle a small, deep, abruptly formed umbilicus. This whirl rapidly enlarges, and terminates in a very large, not very oblique aperture, with the lip expanded so as to make it trumpet-shaped. Largest diameter three-twentieths inch, breadth one-twentieth inch.

This curious little shell was found several years since on the Island of Nantucket, clinging to some damp moss, and was communicated by Mr. J. M. Earle, of Worcester. Specimens of it have also been sent to me by Professor Foreman, of Baltimore. But its characters were not fully ascertained from these few specimens. In July, 1840, Mr. T. J. Whittemore found it in great numbers at Hingham, in a small pool, southeast of the Old Colony House.

It has a miniature resemblance to *P. bicarinatus*, as to its two sides, but it has only a single carina, which encircles the shell, instead of one on each side. Its large, expanded aperture, and small, deeply sunken umbilicus, readily distinguish it from any of the small species hitherto known. The surface is rather rough, and perhaps a little hispid when viewed under the microscope. The *P. lens* of Lea (Amer. Philos. Trans., New Series, VI, 68, pl. xxiii, f. 83), which he received from near Cincinnati, is probably the same as this shell. His name, however, is pre-occupied by a fossil species. (*Gould.*)

Planorbis dilatatus, GOULD, Invert. of Mass. 210, f. 140 (1841); Otia, 182. —HALDEMAN, Mon. 23, pl. iv, f. 16–18 (1844).—DEKAY, N. Y. Moll. 66 (1843).—ANONYMOUS, Can. Nat. II, 209, fig. (1857).

Planorbis dilatus, HALDEMAN, Mon. p. 25 (Jan. 1844).

Fig. 218 is a fac-simile of Gould's figures; his description is copied above.

Dr. Pfeiffer (Arch. f. Nat. 1841, p. 225) has described an European species under the same name, and in the same year (1841) as Dr. Gould's species was published. The latter appeared during the session of the Legislature in the spring. Prof. Haldeman (*l. c.*) suggests the name "*dilatus*," should it be necessary to give a new name to our shell.

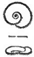
Gould (*l. c.*) refers to this species *Pl. lens*, Lea.

It has been noticed from New England to Maryland.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8310	1	Massachusetts.	W. G. Binney.	Cabinet series.

Planorbis albus, MÜLL.—Shell light yellowish-brown, concave on both sides, most so on the left; whorls three; surface beset with revolving lines of rigid hairs; aperture large, very oblique.

Fig. 219.



Planorbis albus.

Fig. 220.

Planorbis albus.

Fig. 221.

Planorbis albus.

State Coll. No. 82, Soc. Cab. No. 1278.

Shell small, somewhat transparent, of a brownish-yellow color; both sides concave, the left rather more than the right, but the concavity is there more limited by the presence of a sub-angular ridge on the outer whorl; whorls three, the outer one rapidly increasing; surface exhibiting traces of revolving lines when denuded, but usually covered with a dark pigment or epidermis, bristling with rigid hairs which are arranged in close revolving lines; lines of growth very faint; aperture sub-oval, oblique, its diameter from side to side shorter than in the opposite direction; its plane very oblique. Long diameter one-fifth inch, short diameter one-fifteenth inch. Animal has the head slate-colored above, with a darker line along each tentaculum, not originating from the eyes; foot chestnut colored.

This shell was first found by Professor C. B. Adams, in Mansfield, from whom I received it. I have since found it in several localities in Dorchester, Dedham, and Cambridge, adhering to sticks in stagnant water; and it may doubtless be found in all similar localities.

This *Planorbis*, though in many respects it resembles in shape *P. deflec-*

tus, is readily distinguished from all other American species by the revolving hairy lines. It is the analogue of the European *P. albus*, from which it is difficult to designate any very characteristic difference. It is, however, a thinner shell, the last whirl increasing more rapidly; and it maintains its yellowish-horn-color, whereas *P. albus* assumes a spermaceti or still whiter appearance. The lines, too, disappear more entirely when the epidermis is gone. (*Gould.—P. hirsutus.*)

Planorbis albus, Müller, Haldeman, Mon. 29, pl. iv, f. 8–10 (1844).

Planorbis hirsutus, Gould, Am. Journ. Sc. [I], XXXVIII, 196 (1840); Invert. of Mass. 206, f. 135 (1841); Otia, 180.—Adams, Shells of Vt. 156 (1842).—DeKay, N. Y. Moll. 64 (1843).—Anonymous, Can. Nat. II, 206, fig. (1857).

Said to have been found from New England to the Saskatchewan, and in the District of Columbia.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8511	2	....	W. G. Binney.	Cabinet series.

Planorbis parvus, Say.—Shell horn-color or blackish; whirls four, crossed by minute wrinkles; concave above and beneath, and equally exhibiting the volutions, body generally subcarinate on the margin; lip rounded, and not vaulted above nor thickened; mouth within bluish-white. Breadth one-fifth of an inch.

Fig. 222.

Planorbis parvus.

Fig. 223.

Planorbis parvus.

Animal aquatic, brown, tentacula long, filiform, whitish, with a darker central line; tail rounded. Probably the same species with that figured by Lister, tab. 139, fig. 45; it is very numerous in the Delaware, in company with the two preceding shells. (*Say.*)

Fig. 224.

Planorbis parvus.

Planorbis parvus, Say, Nich. Ency. pl. 1, f. 5 (1817, 1818, 1819): Binney's ed. p. 45, pl. lxix, f. 5.—Haldeman, Mon. 27, pl. iv, f. 19–23 (1844).—Gould, Invert. 209, f. 139 (1841).—Adams, Shells of Vt. 156 (1842).—DeKay, N. Y. Moll. 63, pl. iv, f. 58 (1843).—Anon. Can. Nat. II, 208, fig. (1857).

Planorbis concavus, Anthony, Cat. of Shells of Cincinnati, no desc.

Planorbis elevatus, Adams, Bost. Journ. Nat. Hist. III, 327, pl. iii, f. 16 (1840).—Gould, Inv. of Mass. 207 (1841).—DeKay, N. Y. Moll. 65.

Helix parvus, Eaton, Zool. Text-Book, 195 (1826).

Said to inhabit the whole of eastern North America.

Mr. Say's type is still preserved in the Philadelphia Academy's collection.

Haldeman considers *Pl. elevatus* a synonym of this species. No. 8509 of the collection was labelled by J. G. Anthony *Pl. concavus*, a name occurring in catalogues, but not described. I have no doubt of its identity with this species. No description was ever published, as Mr. Anthony informs me, owing to the doubts of its being distinct. The original description and figure of *Pl. elevatus* are given below.

Fig. 225.

Planorbis elevatus.

Planorbis elevatus.—Shell horn-color, finely striate; whirls four, as high as wide; last whirl well rounded, very distinctly carinate below; inclination to the left about 48°; right side convex, flattened at the apex; left side very deeply concave; suture deeply impressed; aperture round-ovate, large, with its upper extending much beyond its lower margin. Greatest breadth .17 inch, least breadth .13 inch, height .06 inch. Cabinets of Bost. Soc. Nat. Hist., of Middlebury College, of S. S. Haldeman, of Marietta, Pa.; of J. G. Anthony, of Cincinnati, and my own.

Habitat. This species was discovered in the summer of 1838, in a small spring in a rocky cavity, in South Boston. Nearly a hundred specimens were obtained, and a much larger number were left. Visiting the same spot a few days since (July, 1840), I found the spring filled up with stones to the top of the water, and not a shell to be seen. Last summer I obtained a specimen in Lake George, N. Y. Dr. Wm. Prescott has found the species in Lynn.

This species much resembles *P. parvus*, Say, and for some time I doubted whether it was distinct. But the specimens uniformly differ from that shell in having the spire elevated above the plane of the last whirl, whereas in that species it is concave, and consequently this species is much more deeply umbilicated on the left side; also, that species is distinctly carinate on the middle of the last whirl, but is very indistinctly carinate below the middle, if at all. (*Adams.*)

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8181	1	Ruby Valley.	Capt. J. H. Simpson.	......
8182	4	Apple Creek.	......	......
8183	21	Northern Georgia.	A. Oerhardt.	......
8184	5	Big Sioux.	......	......
8185	34	Maine.	Dr. J. Lewis	......
8186	7	Marietta, O.	W. Holden.	......
8187	13	Apple Creek, lat. 47°.	......	......
8188	7	Yellowstone River.	......	......
8189	70	Mohawk, N. Y.	Dr. J. Lewis.	......
8503	200	New York.	"	Cabinet series.
9117	5	Moose Factory.	Drexler.	......
9087	8	Fort Simpson.	Kennicott.	......
8512	6	Ann Arbor, Mich.	A. Winchell.	(*Pl. elevatus?*)
8509	6	....	W. G. Binney.	Named *Pl. concavus* [by Anthony.
9295	1	Otter Tail Creek, Min.	Kennicott.	

Planorbis arcticus, Beck.—Shell dextral, horn-colored, thin, convex and excavated in the centre above, concave below; three and a half cylindrical whirls. Diam. 2, 2‴. (*Möller, l. c.*)

Planorbis arcticus, Beck in Möller, Ind. Moll. Grön. 5.—Mörch, Moll. Grön. 76.

I have not been able to obtain any authentic specimen for figuring. The only published description is copied above.

Spurious Species of Planorbis.

Planorbis armigerus and *P. wheatleyi* are *Segmentine.*

Planorbis parallelus, Say, J. A. N. S. II, 164: Binney's ed. p. 63, is *Helix lineata* (q. v.). Authentic specimens among Ferussac's shells in the Garden of Plants are so labelled, as Dr. Gould informs me.

Planorbis niger. I know nothing of this species mentioned as new, with no description, by DeKay in New York Zoological Report of Dec. 20, 1839, p. 32.

Planorbis complanatus, from Western Lakes, is mentioned by name only by Ravenel, Cat. of Shells, p. 11. A foreign species has been described under this name.

Planorbis obtusa, Lea, is mentioned by Wheatley, Cat. of U. S. Shells, 2d ed., p. 22, without description, giving Ohio as habitat. The name is pre-occupied also.

Planorbis eburneus, Chemn., is quoted doubtfully as synonym of *Pl. bicarinatus* in Beck's Index, p. 118, as is

Planorbis subcarinatus, Say (p. 119), of North America, without description, *Physa anceps* of Menke being doubtfully cited as synonym (Lister, Hist. cxxxix, 44): Delaware River; and *subdistortus* as another variety.

Planorbis foveulis, Beck (Ind. 119): Delaware River. No description is given, but reference to Lister, Hist. cxl, f. 47.

Planorbis capillaris, Beck (Ind. 119): Mexico; and *Planorbis fuliginosus*, Beck (Ind. 120): Mexico. No description.

Planorbis evacuus, Villa = *P. exacutus?*

Planorbis glans, DeKay = *Glandina truncata.*

Planorbis alba? Sheppard (Trans. Lit. and Hist. Soc. Quebec, I, 195, 1829).—Shell umbilicated on both sides; upper part of whirls flat, lower convex; aperture wide and angular. (Near Quebec.) = *Plan. albus*, Müll.?

It is the *Helix alba*, Lin., but is not among Lamarck's species. (*Sheppard.*)

Planorbis spirorbis, Sheppard (Trans. of Lit. and Hist. Soc. Quebec, I, 195, 1829).—"One side flat, the other subumbilicate, reverse; horn-colored. (Near Quebec, at Etchemin:)" (*Sheppard.*)

I do not know anything of this species, whether it is the *P. spirorbis* of Europe or not.

FOSSIL SPECIES OF PLANORBIS.

Dr. Meek furnishes me with the following list of fossil species:—

Planorbis spectabilis, MEEK, Proc. Phila. Ac. 1860, 315.
Planorbis utahensis, MEEK, Proc. Phila. Ac. 1860, 314.
Planorbis vitrinus, MEEK & HAYDEN, Proc. Phila. Ac. 1860, 413.
Planorbis nebrascensis, EVANS & SHUMARD, Proc. Phila. Ac. 1854, 154.
Planorbis vetulus, MEEK & HAYDEN, Proc. Phila. Ac. 1860, 175.
Planorbis convolutus, MEEK & HAYDEN, Proc. Phila. Ac. 1856, 120.
Planorbis planoconvex, MEEK & HAYDEN, Proc. Phila. Ac. 1860, 452.
(Olim *fragilis*, MEEK & HAYDEN, Proc. Phila. Ac. 1857, 136, not of DUNKER.)
Planorbis subumbilicatus, MEEK & HAYDEN = *Valvata subumbilicata*, q. v.

SEGMENTINA, FLEMING.

Tentacles filiform. Foot narrow anteriorly, larger behind.

Shell dextral, discoidal, spire depressed, horn-colored; whirls few, visible on both sides, furnished internally with transverse, testaceous partitions or teeth; aperture transversely oval or circular; outer lip simple.

Jaws (of *S. lacustris*) very narrow, very much arched, flexible, scarcely brown, greatly attenuated, pointed. Vertical striæ or marginal denticulations hardly apparent.

Lingual membrane — ?

There are but few species of *Segmentina*, which are not acknowledged as a separate genus by all authors. The name either as generic or subgeneric is universally adopted, as it has priority of *Hemithalamus*, Leach, *Segmentaria*, Swains., and *Discus*, Hald.

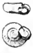
The typical forms are not represented in this country—our two species belonging to the section *Planorbula*.

SUBGENUS PLANORBULA, HALD.

Shell with the aperture furnished with dentiform plicæ, not forming open partitions.

Segmentina wheatleyi, LEA.—Shell small, dark horn-colored, flat, obsoletely striated, bicarinate, depressed above, broadly and deeply umbilicated below; whirls five, obtusely carinated above, below acutely so; aperture white, thick, strongly constricted; within are six teeth.

Fig. 226.



Segmentina wheatleyi.

Fig. 227.

Segmentina wheatleyi.

Cotoma Creek, Montgomery Co., Ala. (*Lea.*)

Planorbis wheatleyi, Lea, Pr. Phila. Acad. Nat. Sc. 1858, p. 41.

I have specimens received from Florida, which, on comparison with Mr. Lea's type, are evidently the same. It is a well-marked species, nearly allied to *Seg. armigera*, but distinguished by its carination, &c., and by the body whirl being continued beyond the thickened, heavy lip, making it "duplicatim continuatum," like that of *Helicina tropica*. The shell figured was given me by Mr. Lea.

Cat. No	No. of Sp.	Locality.	From whom received.	Remarks.
9123	2	Florida.	I. Lea.	Figured.

Segmentina armigera, Say.—Shell dextral, brownish horn-color, wrinkles obsolete; spire perfectly regular, slightly concave; suture well impressed; umbilious profound, exhibiting the volutions; whirls four, longer than wide, obtusely carinated above, carina obsolete near the aperture, a carina beneath continued to the aperture; aperture longitudinally subovate, oblique; labrum blackish on the edge; throat armed with five teeth, placed two upon the pillar side, of which one is large, prominent, perpendicular, lamelliform, oblique, and rounded abruptly at each extremity; near the anterior tip is a small prominent conic acute one; on the side of the labrum is a prominent lamelliform tooth near the base, and two slightly elevated, oblique, lamelliform ones above. Length ¼ of an inch nearly.

Fig. 228.

Segmentina armigera.

Fig. 229.

Segmentina armigera.

Inhabits Upper Missouri.

Remarkable by the teeth, but these are only discoverable by the microscopical examination of the mouth, and they are situated far within it. (*Say.*)

Planorbis armigerus, Say, Jour. Acad. Nat. Sc. II, 164 (1818): Binney's ed. p. 63.—Haldeman, Mon. 30, pl. iv, f. 11–13 (1844).—Gould, Invert. 205, f. 138 (1841).—Adams, Shells of Vt. 155 (1842).—DeKay, N. Y. Moll. 62, pl. iv, f. 64 *a*, *b*, *c* (1843).—Mrs. Gray, Fig. Moll. An. cccx, f. 2.—Anony. Can. Nat. II, 205, fig. (1857).

Segmentina armigera, H. & A. Adams, Gen. Rec. Moll. II, 261, pl. lxxxiv, f. 4.

Planorbella armigera, Chenu, Man. de Conch. II, 283, f. 3570.

Haldeman says "the teeth are present when the shell is a line in length, and as but one set exists in full grown individuals, we must infer that they are absorbed and reproduced from time to time. In overgrown specimens like those figured, it sometimes happens that the teeth are wanting; as if, after their absorption, the energies of the animal were too far exhausted to reproduce them. The outer ones seem to be formed successively from left to right, the small one on the right appearing last, and in its absence, the shell has been described by Say and Gould as being but five-dentate."

Ranges from the Eastern through the Middle, Western, and Northwestern States, and as far north as Peace River.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8196	11	Milwaukee, Wis.	I. A. Lapham.	......
8197	50	....	Dr. J. Lewis.	......
8497	9	New York.	"	Cabinet series.
9116	10	James Bay, B. A.	Drexler.	......
9070	20	Hudson's Bay.	"	......
8970	..	Fort Resolution.	Kennicott.	......
9274	17	Great Slave Lake.	"	......

SUBFAMILY ANCYLINÆ.

Shell non-spiral, conical, limpet-like.

All the known genera of *Ancylinæ* are represented in North America except *Latia*, which has a spiral shell and a transverse septum in the aperture.

ANCYLUS, GEOFFROY.

Fig. 230.

Animal of *Ancylus.*

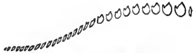
Tentacles triangular, mantle included; pulmonary orifice protected by a branchial appendage. Foot large.

Shell sinistral, thin, patelliform, depressed, non-spiral, apex directed to the right; aperture very wide; peritreme continuous, simple, entire.

Jaws three, covered with papillæ, one superior, small, transversely oblong, two lateral, long, very slightly arcuate, contiguous to the superior.

Lingual membrane broad; teeth crowded, numerous; central minute, narrow, simple; laterals broad, bicuspid, the inner cusp the larger.

Fig. 231.



Lingual dentition of *Ancylus newberryi.*

The *Ancyli* and *Arcroloxi* are widely distributed over the globe. In North America the known species are most numerous in those States where conchological observations have most been made, but an equal number may be found in other regions when they come to be explored. They are found in the extreme north and in Mexico, at every station.[1]

The name *Ancylus* is universally adopted at the present time.

The shell of *Ancylus* is dextral, the apex being directed to the right, but the generative, respiratory, and anal orifices are on the left of the animal, as in *Planorbis.*

So slight are the points of specific distinction in the species of this genus, and so meagre is the material at my disposition, I have considered it best at present to give all the descriptions of species yet published, leaving the synonymy to be decided upon at another time.

Ancylus obscurus, Haldeman.—Shell ovate, somewhat elevated, rather wide, apex but slightly projecting, rather more than one-third of the shell posterior; lateral margins slightly convex; lateral slopes rectilinear; posterior slope with a very slight depression; anterior slope nearly rectilinear. Color dark brown, margin diaphanous. Dimensions: long. 5, lat. 3.5, elev. 1.5 mill. Found in Nolachucky River, below Greenville. (*Haldeman.*)

Fig. 232.

Ancylus obscurus.

Ancylus obscurus, Haldeman, Mon. 9, pl. 1, f. 5 (1844).

Adams quotes it from Jamaica (Contr. to Conch. 50); Shuttleworth (in Berne Mittheil., 1854, p. 98) quotes it from St. Thomas, Jamaica, and Porto Rico.

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[1] Dr. J. G. Cooper found them 7100 feet above the sea on the Sierra Nevada.

Ancylus fuscus, ADAMS.—Shell thin, transparent without the epidermis, not much elevated, elliptical, moderately curved at the sides; epidermis brown, visible through the shell, giving it the appearance of having the same color, thick, rough, slightly extending beyond the margin of the shell; apex obtuse, moderately prominent, scarcely behind the middle, inclining to the right so as to have only two-fifths of the width on that side. Length .31 inch, width .22 inch, height .05 inch. Cabinets of Bost. Soc. Nat. Hist., of Mr. Kinne Prescott of Andover, and my own.

Fig. 233.

Ancylus fuscus.

Habitat and station. This species was found adhering to stones in a small rivulet, at Andover, by Mr. Kinne Prescott, to whom I am indebted for many interesting species of shells. It has also been found at Mansfield.

This species is easily distinguished by its epidermis. The *A. rivularis*, Say, differs also in being much more narrow, having its sides straight, and its apex more acute; and *A. tardus*, Say, is more elevated, and in both of these the apex does not incline so far to the right as in our species. The *A. lacustris*, Drap., is more narrow, with an apex more elevated and acute, and *A. fluviatilis*, Drap., has the apex more prominent and nearer one extremity. (*Adams.*)

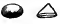
Ancylus fuscus, ADAMS, Bost. Journ. Nat. Hist. III, 329, pl. III, f. 17 (1840); Am. Journ. Sc. [1], XXXVIII, 396 (1840).—HALDEMAN, Mon. 12, pl. 1, f. 7 (1844).—GOULD, inv. 224, f. 152 (1841).—DEKAY, N. Y. Moll. 13 (1843).—ANONY. Can. Nat. II, 212, fig. (1857).

The original description and figure are copied above. It has also been found in Ohio and the District of Columbia.

Cat. No.	No. of Sp	Locality.	From whom received.	Remarks.
8819	20+	Massachusetts.	W. Stimpson.	Cabinet series.
8531	3	Ohio.	I. A. Lapham.	......

Ancylus elatior, ANTHONY.—Shell very much elevated, ovate; lines of growth distant, conspicuous: color light green, opaque; apex decorticated, recurved, sub-central; anterior and posterior slopes convex; lateral slopes plane; apical region rose colored.

Fig. 234.



Ancylus elatior.

Hab. Green River, Kentucky, adhering to small stones and dead shells. Very rare. My cabinet; cab. Lyc. N. H. Length .26 inch (6½ mill.), breadth 0.21 inch (5 mill.), height .14 (3½ mill.).

Obs. This is rather a heavy, robust species, and one not easily confounded with any other; it most nearly resembles, perhaps, *Ancylus crassus*, Hald., but differs from it in being more elevated, in having the lines of growth coarser, and by its rosy apex. It is more elevated than any other specimens of the genus with which I am acquainted.

It is somewhat singular that this should have been the only species of *Ancylus* noticed on a journey of nearly eighteen hundred miles, during which every stream was examined for shells, and this genus was anxiously sought for. (*Anthony.*)

Ancylus elatior, ANTHONY, Ann. N. Y. Lyc. VI, 158, pl. v, f. 20–21 (1855).

Mr. Anthony's description and figure are copied above.

Ancylus diaphanus, HALDEMAN.—Shell thin in texture, diaphanous, very wide, nearly circular, depressed; apex obtuse, almost central! Slope scarcely convex. Color very pale olivaceous, translucent, aperture white. Long. 5.5, lat. 4.5, elev. 2 mill.

Discovered in Ohio, by Mr. Anthony.

Distinguished by its circular and flattened form, and central inconspicuous apex. (*Haldeman.*)

Fig. 235.

Ancylus diaphanus.

Ancylus diaphanus, HALDEMAN, Mon. No. 3, p. 3 of cover, 1841: p. 8, pl. i, f. 4 (1844).—DEKAY, N. Y. Moll. 13 (1843).

Also said to have been found in Wisconsin.

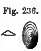
Cat. No	No. of Sp.	Locality.	From whom received	Remarks.
8530	2	Milwaukee, Wis.	I. A. Lapham.	Cabinet series.

Ancylus haldemani, BOURGUIGNAT.—Shell small, oval, elliptic, pale, thin in texture, depressed; ends similarly curved, sides convex, slope nearly rectilinear; apex obtuse, with more than one-third the shell behind it. Long. 4, lat. 2.5, elev. 1.5 mill.

Houston River, in Washington County, southwestern Virginia.

Paler, more depressed, and with a less prominent apex than *A. rivularis* and *tardus*; posterior slope less concave than in the former, and not direct, as in the latter. (*Haldeman.*)

Fig. 236.



Ancylus haldemani.

Ancylus haldemani, BOURGUIGNAT, Pr. Zool. Soc. London, 1853, p. 83.
Ancylus depressus, HALDEMAN, Mon. 6, pl. i, f. 12 (1844).

On the authority of Bourguignat's Memoir on *Ancylus*, *l. c.*, I adopt another name for this species. There is an *A. depressus* of Deshayes, 1824 (*vide* Encycl. Méth. II, 48), and of Keferstein, 1834.

Ancylus sallei, BOURGUIGNAT.—Shell convex anteriorly, posteriorly rectilinear or slightly convex; left side convex, right side rectilinear; posterior apex declining to the right, its summit obtuse so as to be quite indiscernible. Shell small, very fragile, diaphanous, very finely radiated, yellowish. Aperture oblong, 1½ mill. high, 5 mill. long, 2 mill. broad.

Found by Mr. Sallé on fragments of decaying wood in the Laguna Larga de Toxpam, near Cordova, Vera Cruz. (*Bourguignat.*)

Ancylus sallei, BOURGUIGNAT, Mag. de Zool. 1857, 16.

I have seen no specimens of this species. The original description is translated above.

Ancylus parallelus, HALDEMAN.—Shell pale, thin, and delicate; lengthened; sides subrectilinear, diverging slightly forwards; apex rather sharp, conspicuous, with two-fifths of the shell posterior to it. Dimensions: Long. 0.25, lat. 0.15, elev. 0.08 inch (Adams).

Fig. 237.

Ancylus parallelus.

Inhabits New England.

In general appearance resembles *Velletia lacustris*, Müll., of Europe, but is at once distinguishable by having the apex directed towards the right. Professor Adams remarks: "It was supposed to be Say's *A. rivularis*, not on account of any resemblance between the two shells, but from the meagreness of the description. From some remarks of this learned naturalist, comparing *A. rivularis* with *A. tardus*, it seems probable that the former is not an elongate species." (*Haldeman.*)

Ancylus parallelus, HALDEMAN, Mon. pt. 2, p. 3 of cover (1846); p. 11, pl. i, f. 6 (1844).—ADAMS, Shells of Vt. 164 (1842).—DEKAY, N. Y. Moll. 13 (1843).

Ancylus rivularis, GOULD, Inv. of Mass. 224, f. 153 (1841), teste HALDEMAN.—ANON. Can. Nat. II, 212, fig. (1857).

Dr. Gould's *Ancylus rivularis* is considered by Haldeman to be this species and not *A. rivularis*, Say.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks
5818	4	Massachusetts.	W. Stimpson.	Cabinet series.

Ancylus rivularis, SAY.—Shell corneous, opaque, conic-depressed, apex obtuse, nearer to and leaning towards, one side and one end; aperture oval, rather narrower at one end, entire; within milk-white. Length one-fourth of an inch. Cabinet of the Academy.

Fig. 238.

Ancylus rivularis.

Common; adhering to stones in rivulets; the animal resembles the inhabitant of shells of the genus *Limnæa*, the tail is very obtuse, rounded. (*Say.*)

Ancylus rivularis, Say (Oct. 1819), J. A. N. S. I, 125 (1819); Nich. Enc. ed. 3: ed Binn. p. 60.—Haldeman, Mon. 4, pl. i, f. 1 (1844). —DeKay, N. Y. Moll. 12, pl. v, f. 98 *a*, *b* (1843).—Mrs. Gray, Fig. Moll. An. cccx, f. 5.—Not of Gould (= *A. parallelus*).

Also noticed in Virginia and Wisconsin. The figure is copied from Haldeman.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8223	5	Milwaukee, Wis.	I A. Lapham.	......
8492	1	....	J. G. Anthony.	Cabinet series.

Ancylus tardus, Say.—Shell conic depressed; apex behind the middle obtuse, rounded, inclining backward but not laterally; line from the apex to the posterior tip rectilinear; line from the apex to the anterior tip arcuated; aperture oval, not distinctly narrowed at one end. Length a little over three-twentieths (4.25), breadth one-tenth of an inch.

Fig. 239.

Ancylus. tardus.

Differs from *A. rivularis*, Nob., which has the apex leaning towards one side, and the aperture narrower at one end. It is less elongate than *fluviatilis*, Drap., which has an acute and laterally inclined apex.

It inhabits the Wabash River. (*Say.*)

Ancylus tardus, Say, N. H. Diss. Jan. 15, 1840,; Descr. '26: ed. Binney, 149.—Haldeman, Mon. 7, pl. i, f. 3 (1844).—Adams, Shells of Vt. 164, fig. (1842).—DeKay, N. Y. Moll. 13 (1843).

Mr. Say's type is in the collection of the Philadelphia Academy. The species is said to have been found also in Vermont and the District of Columbia. The figure is copied from Haldeman.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
8529	50	Mohawk, N. Y.	Dr. J. Lewis.	Cabinet series.

Ancylus calcarius, DeKay.—Shell conic, calcareous, opaque. Apex not central, moderately prominent; aperture oval, entire; the curves on the longest sides dissimilar. In very minute specimens, the edges somewhat everted. Epidermis rufous, extending beyond the edge of the aperture; within, bluish-white, darker towards the apex. Length 0.3, height 0.12.

Fig. 240.

Ancylus calcarius.

The specimen which furnished the above description was one of the largest which I have seen. They are more commonly of the dimensions of *A. rivularis*. I separate it from this latter, chiefly on account of its solid, calcareous structure. I am indebted to Mr. I. Cozzens for the specimens from the Passaic River, near Paterson, but it will doubtless be found in this State. (*DeKay.*)

Ancylus calcarius, DEKAY, N. Y. Moll. 13, pl. v, f. 99 *a*, *b* (1843).

Fig. 240 is copied from one of DeKay.

Ancylus patelloides, LEA.—Shell large, thick, elliptical, spotted, obliquely conical; striæ minute, crowded; apex submedial.

Fig. 241.

Ancylus patelloides.

Arroya San Antonio, California: Dr. Trask. (*Lea.*)

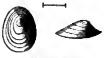
Ancylus patelloides, LEA, Proc. Acad. Nat. Sc. Phila. 1856, VIII, 80.

Fig. 241 is copied from Mr. Lea's original specimen. The species seems nearest allied to *A. crassus*.

Cat No	No. of Sp.	Locality.	From whom received.	Remarks.
8577	3	....	......	Cabinet series.
9203	1	San Francisco.	Judge Cooper.	(Really this species?)
9339	5	Canoe Creek, Cal.	Newberry.	......

Ancylus kootaniensis, BAIRD.—Shell ovate, ashy, concentrically striate, vertex anterior, obtuse, shining within. Length ¼, breadth ⅓ inch.

Fig. 242.



Ancylus kootaniensis.

Hab. Rivers Kootanie and Spokane, British Columbia. Brit. Mus.

The shell is of an ovate form, and is concentrically striated, though the striæ only appear on the lower two-thirds of its surface, the apex being smooth and shining. Internally the shell is shining and somewhat pearly. (*Baird.*)

Ancylus kootaniensis, BAIRD, Proc. Zool. Soc. London, 1863, 69.

The above description is copied from the original. Fig. 242 is drawn from the advance plates of the Report of the British Boundary Commission.

Fig. 243.

Ancylus caurinus.

Ancylus caurinus, COOPER.

Ancylus caurinus, COOPER, in Reports on Nat. Hist., &c., of Minnesota, Nebraska, Washington, &c., p. 378 (1859); P. R. R. XII, 378.

Black River, near Puget Sound.

The shell figured is from Judge Cooper's collection. No description of it was ever published.

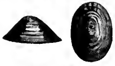
Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9098	1	California.	Judge Cooper.	Type figured.

Ancylus newberryi, Lea.—Shell large, obtusely pyramidal, opaque, smoky red, sides somewhat compressed; apex sub-central; aperture elliptical.

Klamath Lake, California: Dr. J. S. Newberry. (*Lea.*)

Ancylus newberryi, Lea, Proc. Acad. Nat. Sc. Phila. 1858, 166.

Fig. 244.



Ancylus newberryi.

The figures I have given above are from authentic specimens of *A. newberryi*. They are the size of the shell, which is extremely large for the genus.

It was from this species that the Fig. 231, on page 139 was drawn.

The lingual membrane is composed of 72 rows—55 denticles in a row; central tooth minute, laterals bidentate; uncini irregularly denticulated.

Cat. No.	No. of Sp.	Locality.	From whom received.	Remarks.
9337	1	California.	......	Fig. 244. Type.
9338	..	....	......	Lingual membrane figured. Fig. 231.

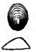
Ancylus crassus, Haldeman.—Shell coarse, somewhat ponderous, wide, ovate, elevated, lines of growth conspicuous; apex eroded, placed far back; anterior and lateral slopes convex, posterior slope steep and rectilinear. Color opaque chestnut-brown. Dimensions: Long. 8, lat. 6.25, elev. 3 mill.

Brought from Oregon by Mr. Nuttall.

Distinguished by its opacity and thick texture—all the preceding species being more or less translucent and delicate. (*Haldeman.*)

Ancylus crassus, Haldeman, Mon. p. 14, pl. i, f. 8 (1844).

Fig. 245.



Ancylus crassus.

Fig. 245 is copied from Haldeman's, whose description is also given above.

Ancylus fragilis, Tryon.—Shell very small and fragile, sides nearly parallel or slightly incurved in the middle, but diverging anteriorly; ends rounded. Apex elevated, acute, curved backwards, with about two-thirds of the shell anterior to it. Size of the largest specimen: Length 4, breadth 1.15, height 1 mill. Most of the specimens do not exceed two-thirds of the dimensions.

Fig. 246.

Ancylus fragilis

Laguna Honha, California: Rev. J. Rowell. My cabinet, and cabinet of Mr. Rowell.

This species is smaller, thinner, and wants the convex lateral margins of our *Anc. rivularis*, Say. It agrees with that shell, however, in the greater width of its anterior end, while in the shape of its lateral margins it resembles *Anc. parallelus*, Hald. It is much the smallest of our species. (*Tryon.*)

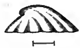
Ancylus fragilis, Tryon, Proc. Phila. Acad. Nat. Sc. 1863, 149, pl. i, f. 15.

Mr. Tryon's description and figure are copied above.

Doubtful Species of Ancylus.

Ancylus drouetianus, Bourguignat.—Shell slightly convex anteriorly, straight posteriorly; summit small, sharp, contracted on its sides, recurved and resting on the posterior wall of the shell, a support which does not always secure it from fracture. Apical depression invisible on account of the apex being bent backwards. Shell very smooth, shining, transparent and horn-colored; surface divided into fifteen triangular compartments, commencing at the apex and enlarging towards the base of the shell, the dividing ridge marking the peristome in an undulating manner. Length 6, height 2–2½, breadth 5 mill.

Fig. 247.



Ancylus drouetianus.

Habitat unknown, but from its characteristics probably belonging to North America. Dedicated to my friend Henry Drouet of Troyes.

Belonging to the group of *A. crassus, radiatilis, rivularis*, &c., but easily distinguished by its triangular divisions and undulating peritreme. Its apex and mode of growth also distinguish it from *A. riparius* and *vitraceus*, which share its other characteristics just mentioned, though they have a very apparent apical depression. (*Bourguignat.*)

The above description and figure are copied from Bourguignat's Memoir on *Ancylus* (Proc. Zool. Soc. 1853, p. 92, pl. xxv, f. 10–17).

Having never seen or heard of any such species in the United States, I doubt its existence there, but have given the description and figure to facilitate its recognition should it be found.

Ancylus filosus is an *Acroloxus*.

ACROLOXUS, Beck.

Tentacles and mantle as in *Ancylus?* Foot large.

Shell dextral, elongated, oblong, patelliform, non-spiral; apex near the middle, directed to the left; aperture very wide; peritreme continuous, simple, entire.

Jaws (of *A. lacustris*) covered with crowded papillæ; upper large, quite arched, laterals rather high, but little approached, narrow, attenuated and pointed below.

Lingual membrane with a central tooth, and twelve lateral teeth on each side, then one tooth of a different form, and lastly six more on each side.

Acroloxus has a sinistral shell, the apex being on the left, but the orifices of the animal are on the right. It further differs from *Ancylus* in its lingual dentition.

The name *Vellettia* is sometimes used for this genus, because Beck gave no description of *Acroloxus*. He gives, however, a list of species sufficiently well known to make the generic distinction evident.

I follow the same plan as in *Ancylus* in giving all the original descriptions and figures of this genus.

Acroloxus nuttallii, Haln.—Shell fuscous, oval, elevated, apex one-fourth of the entire length from one end. Length $\frac{13}{48}$, breadth $\frac{1}{4}$, height $\frac{1}{8}$ inch.

Oregon: Mr. Nuttall. (*Haldeman.*)

Vellettia nuttallii, Haldeman, Mon. pt. 3, p. 3 of cover (1841).—DeKay, N. Y. Moll. 13 (1843).

This is the only known recent species of North American *Acroloxus*, unless *Ancylus filosus*, Conrad, should prove one.

Ancylus filosus, Conrad.—Shell regularly oval, rather elevated, with numerous radiating prominent lines; apex very prominent, inclined, eroded, not nearly central.

Inhabits the Black Warrior River, south of Blount's Springs, Alabama. It is abundant on various species of *Melania*. (*Conrad.*)

Ancylus filosus, Conrad, N. Fr. W. S. p. 57 (1834): ed. Chenu, p. 26.—Haldeman, Mon. p. 10, pl. i, f. 9 (1844).

Fig. 248.

Ancylus filosus.

—DeKay, N. Y. Moll. 13 (1843).—Müller, Syn. Test. 1834 prom. p. 2 (1836).

In the plate referred to, Prof. Haldeman calls this species a *Vellettia*. In the text he placed it in *Ancylus*. I have copied his figure.

Cat. No.	No. of Sp	Locality.	From whom received.	Remarks.
8950	..	Alabama.	J. G Anthony.	Cabinet series.

Fossil Species of Acroloxus.

Dr. Meek gives me the following name of a fossil species:—

Acroloxus minutus, Meek & Hayden MSS. (*Ancylus minutus*, Proc. Acad. 1856, p. 120.)

GUNDLACHIA, Pfeiffer.

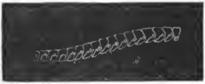
Tentacles — ? Mantle — ? Foot — ?

Shell thin, ancyliform, non-spiral, obliquely conical; apex inclined backwards, basal side two-thirds closed with a flat, horizontal lamina; aperture anterior, horizontal, semicircular; peritreme continuous, simple, entire.

Jaw — ?

Lingual membrane (of *G. californica*) with a small bicuspid central, and 16, oblique, tricuspid lateral teeth.

Fig. 249.



Lingual dentition of *Gundlachia californica*.

This is a strictly American genus as far as is now known, species having been described from the West Indies and Central America. In the Boston Proc. 1863, 249, will be found an extremely interesting account by Dr. Stimpson of the growth of the animal.

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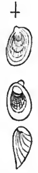
Gundlachia californica, Rowell.—Shell with the aperture suboval, obliquely expanded towards the left, posteriorly rounded, and wider anteriorly. Internal shelf reaching forward about one-fifth the length of the shell, its margin slightly concave and oblique. Dorsal surface convex, becoming somewhat keel-shaped towards the apex, which is strongly and obliquely deflected so as to make the right border nearly a straight line, while the expansion on the left projects nearly as far back as the apex at an obtuse angle. Structure corneous, with strong concentric lines of growth and faint radiating striæ. Color dark brown, opaque; inner surface shining and purplish, the plate white towards the edge, and in some specimens showing a thickened, white semicircle continuous with its margin across the arch of the shell. Length about sixteen one hundredths, breadth eight one hundredths, and height six one hundredths of an English inch.

Fig. 250.



Gundlachia californica.

More than fifty specimens were found on water plants in clear stagnant ponds, two or more often sticking on the back of a larger one.

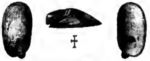
The discovery of this little shell in California is of great interest, the only species hitherto known being found in Cuba. The generic characters of this shell are strictly parallel with that species, while those mentioned as specific easily distinguish it. The Cuban shell is more elongated, regularly oval, the apex projecting considerably beyond the margin of the aperture, which is not obliquely expanded posteriorly. Its size is about one-fifth larger than that of ours. According to Bourguignat, the young shell is a simple obtuse cone, with a semicircular aperture formed by the edge of the shelf, and the thickened dorsal margin; but as it grows the animal changes the form of the aperture until the opening beneath the shelf becomes like the small end of a broad funnel, which in some of our specimens is still shown by the white semicircular ring.

The shell much resembles that of the marine *Crypta* (*Crepidula*), and also *Navicella* of tropical estuaries; but the animal is quite different in the Cuban species, and will undoubtedly prove so in the Californian. (*Rowell.*)

Gundlachia californica, Rowell, Proc. Cal. Acad. Nat. Sc. III, 21, March, 1863.

I have seen no specimen of this shell whose original description and figure are copied above. Fig. 251 is drawn from an authentic specimen received by Dr. J. G. Cooper.

Fig. 251.

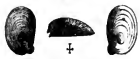


Gundlachia californica.

From one of the same lot the lingual membrane figured on page 148 was drawn.

Gundlachia meekiana, STIMPSON.—The full-grown shell, in general form, is ovate. It is much broader than in *G. ancyliformis*, and has a less ovate aperture than in *G. californica*, as may be seen by comparison of the figures. The shell consists of two distinct parts, and from above looks very much like a small and thick, black *Ancylus*, sticking obliquely and to the right upon the posterior end of the back of a larger thin and whitish one. These two parts we will call, for convenience, respectively the smaller shell and the larger shell. The two parts nearly resemble each other in outline, each being oblong, roundedly truncate before, and narrowed and somewhat obliquely truncated behind, the right posterior angle being prominent. The dorsal part, or smaller shell, as before stated, is black opaque, and comparatively thick. It is about one-third as long as the larger shell, and has the usual form of a young *Ancylus*, the very obtuse apex being at the posterior third of its length and inclined to the right. Anteriorly it is continuous with the dorsum of the larger shell, but posteriorly it projects freely over and beyond the margin of that shell, at its posterior dexter angle, at a distance equalling rather less than a fourth of its own length. Inferiorly, the entrance of this projecting portion of the smaller shell is closed by a flat septum, extending from margin to margin, and continuous anteriorly with the dorsum and internal shelf of the larger shell presently to be described.

Fig. 252.

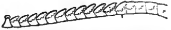


Gundlachia meekiana.

The larger shell is thin, translucent, presenting signs of rapid growth, and usually of a whitish or very pale horn-color. It is more expanded to the left than to the right, the dorsum and left slope being strongly convex, while the right slope is nearly straight. It is marked with prominent striæ of growth and indistinct radiating lines. Within, at the narrower posterior end, there is a rather strong white shelf, formed by the soldering of the dorsum of the larger to the septum of the smaller shell, which extends forward and upward, nearly to the bottom of the concavity, leaving, however, an aperture which leads into the cavity of the smaller shell, in which the liver of the animal is seated. This aperture is exactly semilunar in shape, its longer diameter being of course coincident with the width of the smaller shell and equalling about one-third that of the larger shell. In younger specimens the shelf is a little less extensive, and the apical aperture somewhat larger.

The soft parts of the animal, except in the form of the visceral sack, agree so closely with those of true *Ancyli*, that I have not succeeded in finding any differences of importance. I add here a figure of its lingual dentition. This resembles very nearly that of a species of *Ancylus* common in the District (which appears to be the *A. rivularis* of Say and Haldeman), differing from it only in having two or three teeth less in number, and in the more numerous denticles with which its lateral teeth are armed.

Fig. 253.



Lingual dentition of *Gundlachia meekiana.*

After a close examination of the above characters, I have ventured to suggest that the *Gundlachia* commences its life as an *Ancylus;* the smaller shell, in which the earlier period of its life is spent, being undistinguishable in form from the shells of that genus. It is probable that it passes the first summer and autumn of its existence in this smaller shell, and that the septum which afterwards partially closes its aperture is formed during the period of inaction which ensues during the winter.

This septum would in some degree serve as a protection to the mollusk during this period, in the same way as the epiphragm of the *Helices.*

In the following spring—the period of greatest activity in growth with all the fresh-water Pulmonates—the animal throws forth its newer and larger shell, retaining the older one on its back for the protection of its more tender viscera. It therefore will be a matter of great interest and importance to observe these animals in the latter part of winter, when the formation of the newer shell is about to commence. At that period, they will be found to present the primary form, namely, that of an *Ancylus* with two-thirds of its aperture closed by a septum, leaving but a small opening for the egress of the foot of the animal.

This remarkable little mollusk, of a genus new to our Fauna, has occurred to me in one locality only, a small pond of clear water, in a marshy bank of the Potomac, on the northern side, between Georgetown and the Little Falls in one direction and between the canal and the river on the other. The pond is about one mile below the so-called "Chain Bridge." Five specimens only were found after repeated search.

I have dedicated this species to my friend, Mr. F. B. Meek, the most accurate of American investigators in Fossil Conchology, the pleasure of whose company I enjoyed during several excursions for the purpose of procuring specimens of it. (*Stimpson.*)

Gundlachia meekiana, STIMPSON, Proc. Bost. Soc. 1863, 249, fig.

SUBORDER THALASSOPHILA.

Eyes sessile on the front part of the frontal disk formed by the expanded tentacles. Operculum sometimes present. Animal marine, or living in the vicinity of the sea.

There are two families now known to belong to this suborder, one of which, *Amphibolidæ*, is not represented in this country; species belonging to it are furnished with an operculum and are still more marine in their habits than the *Siphonariidæ*. Still, they have the lingual dentition of Pulmonata, the mantle margin nearly closed, and but rudiments of gills.

FAMILY SIPHONARIIDÆ.

Lingual membrane broad, rather long; teeth numerous, equal, in slightly arched, cross lines; the central tooth narrow, elongated, with a small, rhombic apex; the lateral teeth larger, diverging, gradually diminishing in size towards the outer side of the series, and furnished with a rather oblique, curved tip. Head with a large frontal disk, bilobed in front, and formed by the expanded tentacles; eyes sessile on the outer side of the disk. Respiratory orifices covered by a large fleshy lobe of the mantle.

Operculum none. Shell conical, patelliform, with an internal groove on the right side.

The *Siphonariidæ* are marine in their habits, living near the sea, on rocks between tide marks, or higher above the water but dashed by the spray.

The single genus of the family is represented in this country.

SIPHONARIA, BLAINV.

Shell trumpet-like, orbicular, depressly conical; apex subcentral, oblique, recurved posteriorly; aperture wide, margin irregular, crenulated; muscular impression crescentic; a syphonal groove on the right side, which is extended in a projection beyond the margin.

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Hermannsen uses the name *Siphonaria* in preference to *Liria*, Gray

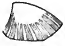
The *Siphonariæ* are marine, being found adhering to rocks between tide marks; they have a widely extended geographical range, but are most numerous in the tropics.

Siphonaria alternata, Say.—Shell conical, with upwards of thirty obsolete, hardly raised, unequal ribs; apex obliquely curved, the tip pointing nearly in a parallel direction with the surface of the shell, and acute; color brown, radiated with white; base oval. Breadth three-tenth inch.

Inhabits the southern coast of East Florida.

It seems to approach the *leucopleura*, as described by authors, excepting that the base is not ovate, as the base of that shell is said to be. (*Say.*)

Fig. 254.



Siphonaria alternata.

Patella alternata, Say, Journ. Acad. Nat. Sc. V, 215 (1826): ed. Binney, 124.

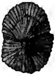
Siphonaria alternata, Say (1832), Am. Conch. IV, pl. xxxviii: Binney's ed. p. 192, pl. xxxviii; ed. Chenu, 50, pl. xiii, f. 3.

I have not seen this species. Fig. 254 is copied from Say's figure.

Siphonaria æquilirata, Carpenter.—Shell sub-conic, oval, regular, radiately ornamented with numerous subrugulose, equal ridges, the interstices being narrow and smooth; dark olive, ridges high; epidermis thin, adherent; internal surface dusky, hardly iridescent; edge crenulated; canal sub-central, scarcely showing exteriorly. Length .83, breadth .57, height .3.

One specimen of beautiful growth in the Mazatlan collection agrees with a larger but somewhat irregular one in that of Mr. Cuming, in characters which appear to separate it from all varieties of *S. lecanium*. Riblets equal, interstices smooth, channel nearer the middle and not conspicuous either by swelling or special marking outside. The Mazatlan specimen has much broader interstices than that of Mr. Cuming; but as the riblets are bifurcating, it is probably not fully grown. There is no trace of striulæ. The examination of more specimens may possibly merge it into the polymorphous *S. lecanium*, from the extreme variety of which the non-prominence of the canal appears to separate it. (*Carpenter.*)

Fig. 255.



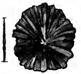
Siphonaria æquilirata.

Siphonaria æquilirata, Carpenter, Maz. Cat. 184.—Reeve, Con. Icon. 15.

Gulf of California. Mazatlan. Fig. 255 is copied from Reeve.

Siphonaria amara, Reeve.—Shell ovate, depressly conoid, apex anteriorly uncinate, radiately closely ribbed and ridged; black, rayed with white bands.

Fig. 256.



Siphonaria amara.

Chiefly to be recognized by its white rays upon a cinder black ground. (*Reeve.*)

Siphonaria amara, Reeve, Con. Icon. 33.

California. Reeve's description and figure are given above.

Siphonaria lecanium, Philippi.—Shell small, usually ovate, sometimes subcircular, projecting at the channel; subconic or very much depressed; ash-colored, variously colored with red; epidermis thin, adherent; ribs at unequal or regular intervals, subacute or very much rounded, the intervals usually with more delicate riblets; stronger ribs from twelve to twenty-two; both ribs and riblets delicately marked by radiating, subrugose striæ; ribs and internal margin sometimes white; apex sub-central, smooth, flattened; interior black or brown, more rarely white, very rarely greenish; margin irregularly crenulated or stellate; rounded ribs projecting; channel declining. Length of the largest flattened form (including palmations) .96, lat. .89, alt. .18; of a sub-conical specimen, .76, alt. .24 inch.

Mazatlan. (*Carpenter.*)

Siphonaria lecanium, Philippi, Z. für Mal. IV, 51 (1846).—Carpenter, Br. Mus. Cat. Relg. 182 (1856).

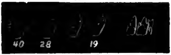
The above is Mr. Carpenter's description of an extremely variable species. He suggests the flattened form with stout, rounded, projecting palmate ribs should be called var. *palmata.*

ADDENDA, Etc.

Limnæa stagnalis. (See p. 28.)

Fig. 257 represents the lingual dentition of a specimen lately received from the Lake of Geneva. There are 100 rows of 47 . 1 . 47 teeth each.

Fig. 257.

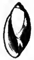


Lingual dentition of *Limnæa stagnalis.*

Bulinus berlandierianus.—Shell cylindrical, smooth, whitened, rather thick; whirls five, the upper ones narrowly flattened, the lower one comprising more than fifteen-seventeenths of the whole length of the shell; quite compressed; aperture very long, narrow; columella simple, with a light callus. Length 17, greatest breadth 8; of aperture, length 14, breadth 4 millimetres.

Bulinus berlandierianus, W. G. Binney, Am. Journ. of Conch. I, 51, pl. vii, f. 8.

Fig. 258.



Bulinus berlandierianus.

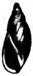
Texas, in the region of Matamoras.

Six specimens were presented to the Smithsonian Institution by Gen. Couch, among the shells collected by Berlandiére.

This species resembles *Bulinus elatus*, Gld., more than any other known to inhabit North America. But that species is very much thinner and delicate, has a longer, more pointed spire, a shorter aperture and more convex body whirl.

Fig. 259 is drawn from the largest American specimen of the widely distributed *Bulinus hypnorum.* It shows how slight is the resemblance to that species in *B. berlandierianus.*

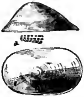
Fig. 259.



Bulinus hypnorum.

Ancylus borealis, Morse.—Shell elliptical, solid, light yellow, apex elevated, rounded, very obtuse, nearer the posterior margin of the shell; lateral slopes steep, anterior slope slightly convex, near the apex; posterior slope straight. Fine regularly interrupted radiating lines mark the surface of the shell from the apex to the borders; incremental lines irregular. Length .14 inch, breadth .09 inch, height .06 inch.

Fig. 260.



Ancylus borealis.

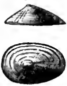
This species resembles *A. tardus* in its general form. It is much smaller, however, and has a strong heavy shell.

Discovered by John M. Gould, at Patten, in the northern part of the State. (*Morse.*)

Ancylus borealis, Morse, Journ. Portland Soc. I, 45, f. 103, 104.

Acroloxus ovalis, Morse.—I propose this and the following species with some reluctance, as the specific characters of nearly all the species of this genus are but faintly marked, and the danger of multiplying false species is but too apparent; still, believing these to be new, I present them.

Fig. 261.



Ancylus ovalis.

Shell very small, depressed, irregularly ovate, apex nearly central, round, smooth, and blunt, slightly inclined to the left, slopes irregular, caused by different periods of repose and growth, posterior slope in most specimens straight, anterior slope convex, lateral slopes steep, shell widening anteriorly; lines of accretion extremely fine, visible within but requiring a magnifier to discern them without, being greatly obscured by fine grains of sand agglutinated to the surface. Periostraca pale yellow, the surface when magnified exhibits about fifty-five delicate ribs, which radiate from the apex to the periphery of the shell. Length .12 inch, breadth .10 inch, height .06 inch.

This species was discovered by John M. Gould, in the Androscoggin River, at Bethel, Maine, in 1854. I have since found it in the above locality clinging to the under side of stones near the shore, in positions where it could in no way reach the surface of the water. (*Morse.*)

Ancylus ovalis, Morse, Journ. Portland Soc. I, 44, f. 101, 102.

The descriptions and figures of this and the preceding species are copied from Morse.

On p. 103, before Planorbis, the following should be inserted:—

Subfamily PLANORBINÆ.

Shell spiral, discoidal or depressed, many whirled; aperture crescentic.

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INDEX.

In the present index all synonyms and spurious species are in italics. Where several references are given for one name, the first generally relates to the page containing the full description.

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